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THESIS

THE COST GROWTH PROBLEM: A REALISTIC
DIAGNOSIS AND SOLUTION

by

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June 1983

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The Cost Growth Problem: A Realistic
Diagnosis and Solution

by

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B.S.M.E., University of Maryland, 1975

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The problem of cost growth of major systems acquisitions has long been an important concern within the Department of Defense (DOD) and Congress. A brief review of acquisition history from the 40's to the present shows little success in controlling it. With so many unsuccessful past changes to the organization and processes, the cost growth problem begs for a new approach. A review of the static principles of organizational design reveals several inconsistencies when compared to the DOD structure. The science of organizational development (OD) is discussed and recommended as a solution.

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I. INTRODUCTION

The purpose of this research is to convince the reader to consider, to support, and to help create a major change within the acquisition process in order to eliminate excessive cost growth. The research has revealed some startling conclusions about the management techniques employed within DOD. Only through publication and dissemination of a document such as this thesis can a DOD community understanding of the cost growth problem be achieved. It is anticipated that this thesis will stimulate a desire for a community-wide, planned change, managed from the top, for a long-term solution to the cost growth problem. This solution is achievable by implementing successful behavioral science skills developed and utilized by other successful bureaucracies.

A. OBJECTIVE OF RESEARCH

The objective of this research is to examine the problem of cost growth from a common sense viewpoint in order to develop a realistic solution to the DOD-wide problem.

B. RESEARCH QUESTIONS

The questions underpinning the research are:

What are the causes of cost growth?

What management techniques have been successful in the past in controlling cost growth?

What are successful management techniques?

What can be done today; what tools/techniques are available to control cost growth?

C. METHODOLOGY

To accomplish the objective and answer the above four questions, a review of: (1) the acquisition process for major weapon systems, (2) the history of attempted solutions, (3) successful management techniques, and (4) organizational development is presented.

The causes of cost growth are extracted from existing literature but are rearranged and categorized according to responsible groups (i.e., Congress, the DOD structure, program management, contractor, etc.).

Finally, conclusions and recommendations are presented. Most of the recommendations evolve from other successful bureaucracies.

D. INTERPRETATION OF COST GROWTH

1. Definition

Cost growth refers to the net change of current estimates over a base figure previously established [Ref. 1: 2-25].

2. Origin of the Term "Cost Growth"

Prior to 1969, the term "cost growth" did not actually exist. More often the term for something costing more than planned was "cost overrun." The term cost overrun was used by the public, media, and Defense critics in a very broad

sense which often led to misunderstanding and confusion. Thus, in 1969, an ad hoc committee established by the Office of the Secretary of Defense (OSD) recommended using the term "cost growth" to "supplant the term 'cost overrun' to describe total cost increases in defense programs" [Ref. 2: 94].

3. Methods of Measurement

Past studies and research by the Rand Corporation, the Congressional Budget Office (CBO), the Institute for Defense Analysis (IDA) and other team or individual reports normally approach cost growth from the Selected Acquisition Report (SAR), DODI 7000.3, viewpoint when discussing causes. Additionally, these reports use graphs and charts to indicate the various cost changes in programs which are grouped individually, en masse, or by program category, with time being the bottom axis (abscissa).

The Rand Corporation has employed a cost ratio of current estimate costs to development estimate costs (CE/DE) to express cost growth.

The method employed in Chapter V to discuss cost growth diverts from traditional numerical approaches and instead evaluates a program's management from a macroscopic view.

a. Selected Acquisition Report (SAR) Categories

The categorical causes of cost growth traditionally evaluated are presented here for informational purposes only.

According to the April 1979 revision of DOD Instruction 7000.3, Selected Acquisition Reports (SAR), the variance categories measured at DSARC II are:

Economic Change: Solely owing to inflation rates different from those originally predicted.

Quantity Change: Variation due to buying different quantities than originally planned.

Schedule Change: The cost effects of revisions in delivery schedules of hardware or documentation or in completion dates of tests. (This category includes such cases as terminating and perhaps rehiring and retraining workers.)

Engineering Change: Cost variation due to alteration of physical item and/or functional characteristics of the major equipment item.

Estimating Change: Variation due to correction of estimating errors in the baseline cost projection or adjustment for assumption not provided for in engineering, schedule, or support variance categories.

Support Change: Cost variation due to training and training equipment, initial spares, manuals, etc.

Cost Overrun/Underrun: These are costs fully attributed to the performance of contractors.

Other: Reasons not covered in other categories.

E. PRESENT STATUS OF COST GROWTH

It is not uncommon today to pick up any newspaper or magazine and find an article about Defense mismanagement. For example, mentioned in a 14 February 1983 issue of Time Magazine was the following: "Outside critics have long accused the military services of misleading, inefficient practices that cause huge cost overruns and long delays in the delivery of weapons."

On television, both CBS's "60 Minutes" and ABC's "20/20" have aired a gamut of cost growth and Defense mismanagement pieces.

Repetition of the plethora of media attention is not necessary here. It is necessary for the reader to continue review of this document to learn the causes of cost growth.

It is sufficient to suggest that the present situation facing DOD in relation to this topic is:

- it has been researched to death with no effective solutions;
- it occurs year after year, decade after decade;
- a realistic solution has not evolved;
- it is receiving more public attention, and
- the growth numbers seem to become worse and worse.

To provide the reader with a numerical base for cost growth, a summary of the 46 SAR programs as reported by DOD AOSD (C) as of 30 September 1982 is presented in the following table:

	NUMBER OF PROGRAMS	(\$ BILLIONS) DEVELOPMENT ESTIMATE FOR TOTAL PROGRAM COSTS AT DSCAR II	% COST GROWTH ADJUSTED FOR QUANTITY
ARMY	13	31.192	113%
NAVY	19	86.998	43
AIR FORCE	14	58.720	58
GRAND TOTAL	46	178.910	57

Considering the methods of reporting, assumptions, and other allowances, this cost growth could easily be much worse.

For those not familiar with the major weapon system acquisition process, Chapter II is a review of the process. Those who are familiar with the major weapon system acquisition process should go to Chapter III for a discussion of the history of attempted solutions which provides insight to the cost growth problem.

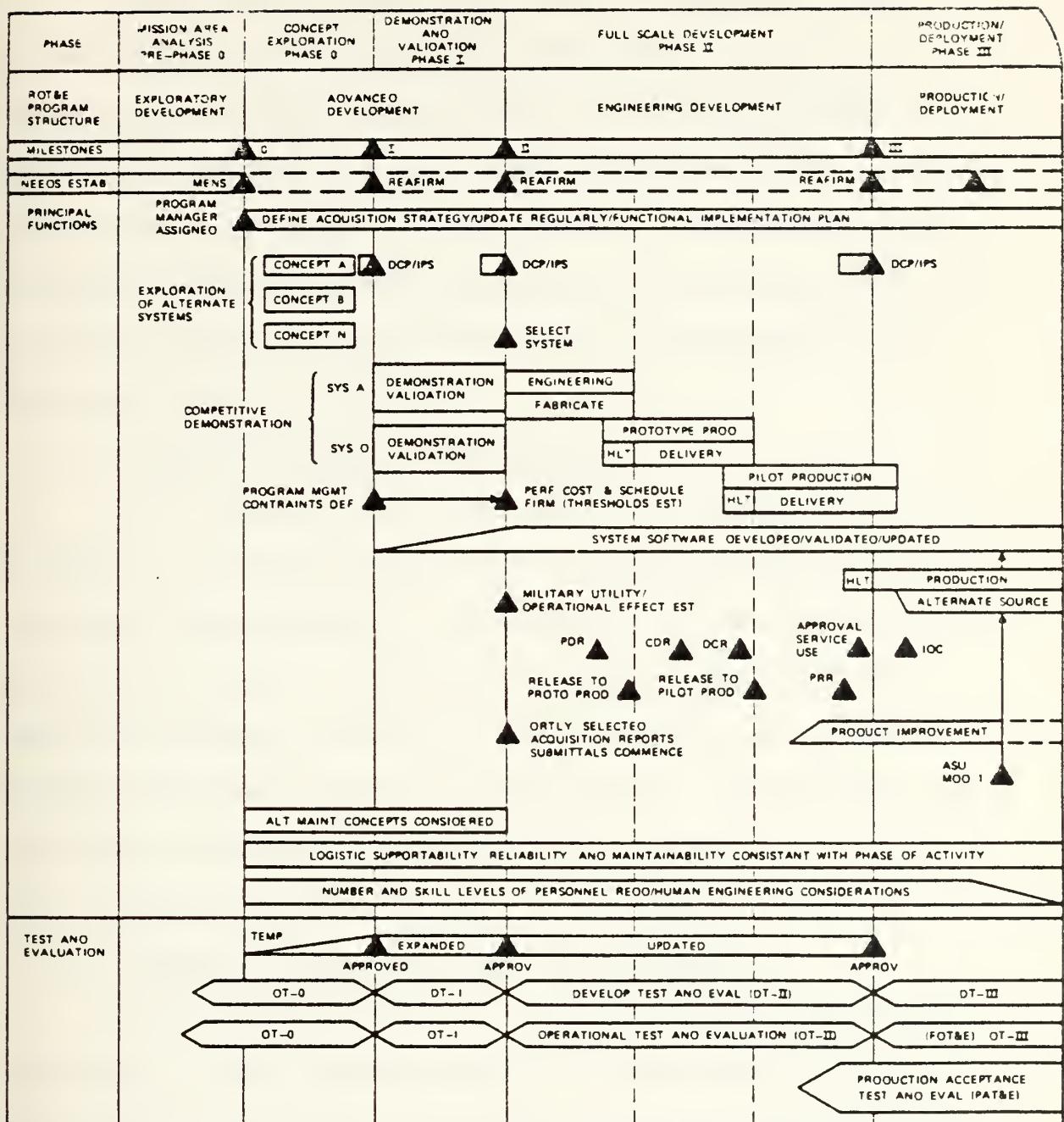
II. THE ACQUISITION PROCESS FOR MAJOR WEAPONS SYSTEMS

The purpose of this chapter is to provide a basic knowledge of the present acquisition process for major weapons systems to assist the reader in the interpretation of the history of cost growth presented in Chapter III and, more importantly, the causes of cost growth presented in Chapter V. This chapter will highlight the important elements and areas of consideration for the acquisition of a major weapon system. Major system acquisition for the three services is governed by Department of Defense Directive (DODD) 5000.1.

A. A SYSTEM'S LIFE CYCLE

DODD 5000.1 defines four distinct phases of the acquisition process, phases 0, I, II and III. Two other phases are often considered in discussions of the life cycle, a pre-phase 0 period and a period for phase-out. The researcher will briefly discuss these phases also.

It is not necessary for every system to move through each phase one by one, nor is it unusual for a system development to begin at any of the phases prior to or at phase III. Figure 1 presents the first five phases of the life cycle as an overview of the acquisition process [Ref. 3: 1-12].



DCP/IPS - DECISION COORDINATING PAPER/INTEGRATED PROGRAM SUMMARY
 PDR - PRELIMINARY DESIGN REVIEW CDR - CRITICAL DESIGN REVIEW
 DCR - DESIGN CERTIFICATION REVIEW PRR - PRODUCTION READINESS REVIEW
 IOC - INITIAL OPERATIONAL CAPABILITY HLT - HARDWARE LEAD TIME

Figure 1. Summary Overview of the Acquisition Process

1. Pre-phase 0: On-going Mission Analysis

The starting point for a major system originates in many sources. The need may arise from a perceived or changed threat, from obsolescence of existing systems, or from a technological or cost reduction opportunity. Ideally the mission need would originate from a situational summary, a document which discusses weaknesses of an operational plan as experienced during trial maneuvers or exercises of a Unified or Specified Command.

2. Phase 0: Concept Exploration

It is during this phase that the program manager is assigned, and several alternative concepts or methods to accomplish the mission are considered. At the end of this phase, Milestone I, a decision is made by the reviewing committees/groups to select the alternative or to request further development in the ensuing phase. Alternative concepts for achieving the mission need may be solicited from R&D laboratories, universities, or industry.

3. Phase I: Demonstration and Validation

This is a key phase as it verifies the ability of the design to meet mission needs. During this phase, the alternatives selected from phase 0 are to be demonstrated, either by analysis or actual prototype design in order to verify the capability/availability/credibility of the critical aspects of the system design. Prior to the next phase,

decisions are made to select the best alternative for further development.

4. Phase II: Full-scale Development

Full-scale development is considered to include three sub-phases for completing the design and verifying its effectiveness through testing. The sub-phases are detail engineering, prototyping and a pilot production sub-phase. This phase is important for several reasons. During this phase, a production contractor is selected and the second source, if high-volume production is planned, is selected. Prior to selecting a second source, the strategy for second sourcing must be firmly developed as requirements (data, etc.) for the second source must be obtained through previous contracting. In this phase, prior testing culminates with the signing of approval for service use (ASU) prior to proceeding to the next phase. (ASU may soon not be required.)

5. Phase III: Production and Deployment

This is the most costly of all the phases. During production and deployment, the system is assembled in accordance with previously developed documentation and put into use by the particular service. For high-volume production, second sourcing, in accordance with the previously designed strategy, is normally used during this phase. For low-volume production, where the systems are highly sophisticated, it may be desirable to second source subsystems or components.

During production, it is necessary to closely monitor the quality assurance of the system through testing.

6. Phase-out: Program Office and System

This phase considers both the system/equipment phase-out and program office phase-out. During the program office phase-out, a historical account of significant events, lessons learned, important people, associated companies, and research centers should be documented. During equipment phase-out, supply support and training programs should be terminated. Facilities dedicated to the phased-out system should be recommended for other use.

7. Costs During the Life Cycle

Planning the total life cycle cost of a system must be considered on an equal basis with performance, time, and logistic element requirements. Planning future cost considerations of producibility, manpower requirements, maintainability and reliability into the design can mitigate exorbitant costs during the final phases of the life cycle. Figure 2 presents typical percentages of the total expenditures during each phase. Significant impact on lowering future costs is obtained by effective decision making in the early phases.

B. REVIEW HIERARCHY FOR EACH PHASE

Each of the services contains its own hierarchy of reviews required for a major systems acquisition. These

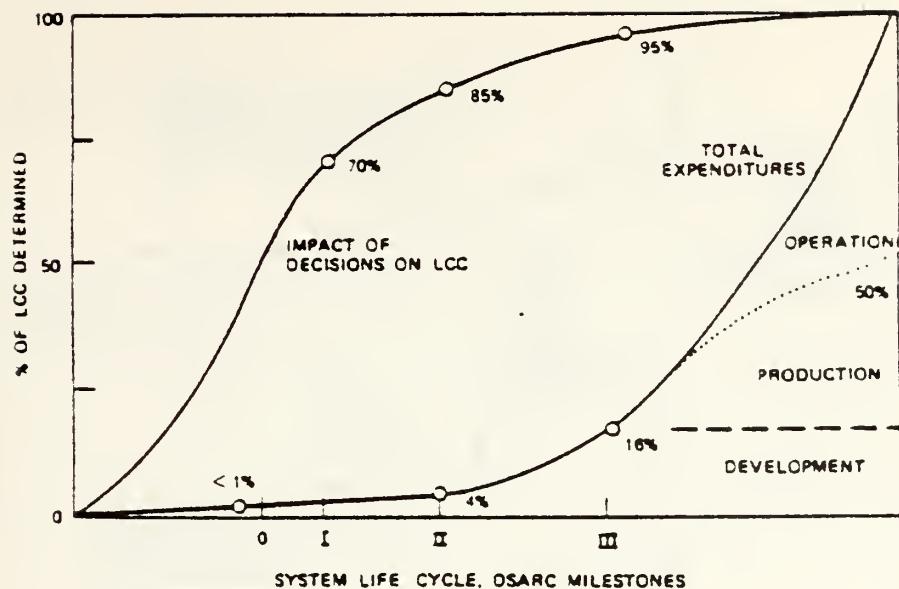


Figure 2. System Life Cycle Cost.

review hierarchies of each service are presented in Figure 3. The importance of this subsection of the thesis is to demonstrate that, prior to continuation of each ensuing phase, each hierarchical level must be satisfied. Without the acceptance of the hierarchical level, system development cannot continue.

C. SALIENT DOCUMENTATION FOR EACH PHASE

This section explains the important documents that the above hierarchical levels evaluate during their review.

Before each phase continues, there are several documents which must be approved at Milestone decision points. These milestones correspond to the beginning date of each phase, shown in Figure 1. The approval document for major systems

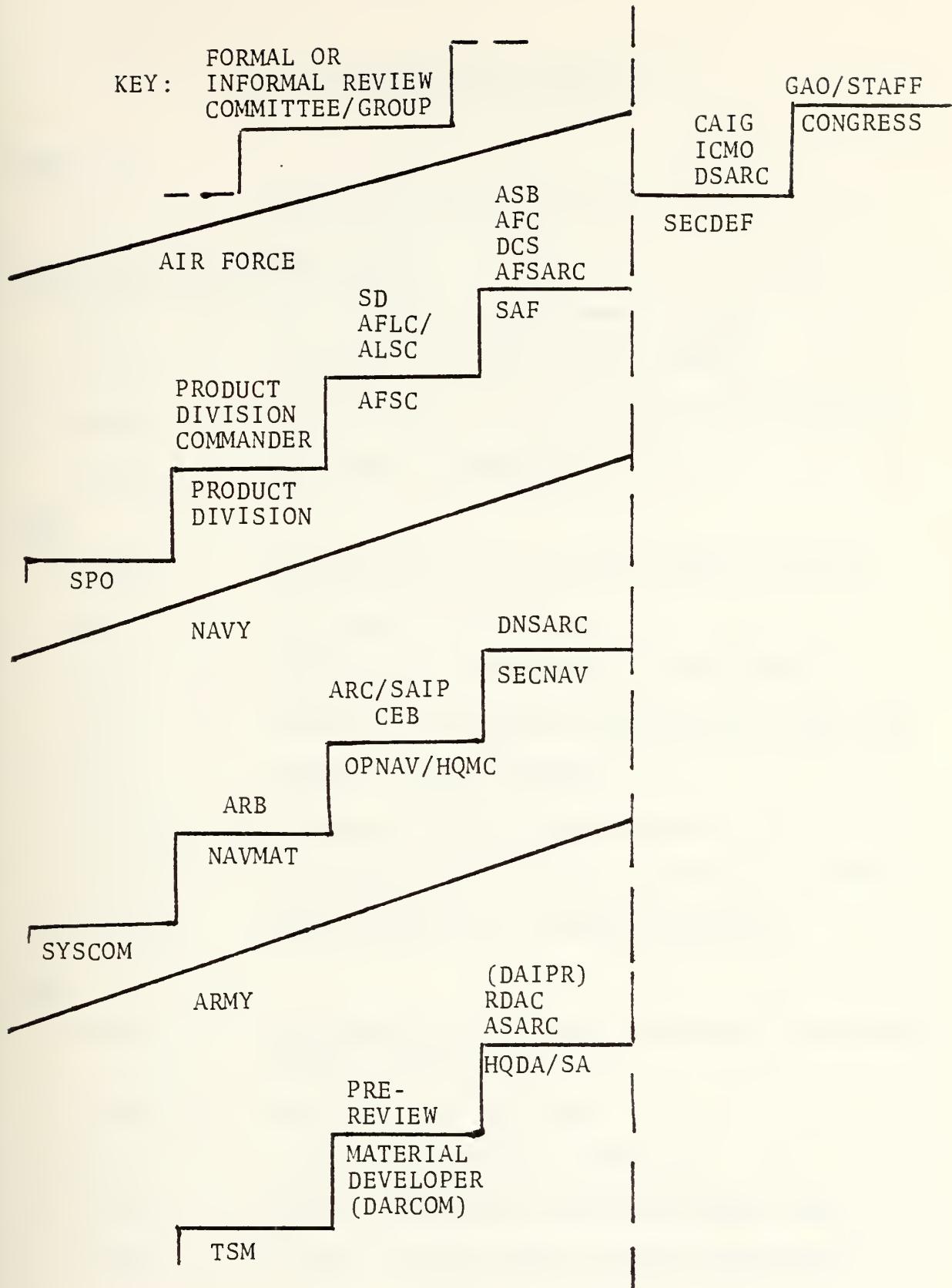


Figure 3. Reviews for Each Service and Milestone.

ACRONYMS FOR FIGURE 3

Congress

GAO General Accounting Office

Department of Defense (DOD)

CAIG Cost Analysis Improvement Group

ICMO Indirect Cost Monitoring Office

DSARC Defense Systems Acquisition Review Council

SECDEF Secretary of Defense

Army

ASARC Army Systems Acquisition Review Council

SA Secretary of the Army

HQDA Headquarters Department of the Army

RDAL Research Development Acquisition Committee

TSM TRADOC Systems Manager

TRADOC Training and Doctrine Command

DAIPR Department of the Army In-Process Review

DARCOM Development and Readiness Command

Navy

DNSARC Department of the Navy, Systems Acquisition Review Council

SECNAV Secretary of the Navy

ARC Acquisition Review Committee

SAIP Ship Acquisition and Improvement Panel

OPNAV Office of the Chief of Naval Operations

ARB Acquisition Review Board

ACRONYMS FOR FIGURE 3 (CONTINUED)

NAVMAT	Naval Material Command
SYSCOM	Systems Command
CEB	CNO Evaluation Board
CNO	Chief of Naval Operations
HQMC	Headquarters Marine Corps

Air Force

SAF	Secretary of the Air Force
AFSARC	Air Force Systems Acquisition Review Council
ASB	Air Staff Board
AFC	Air Force Council
HQUSAFAF	Headquarters United States Air Force
AFSC	Air Force Systems Command
AFLC	Air Force Logistics Command
MAJCOM	Major Command
SPO	Systems Project Office
DCS	Deputy Chief of Staff for Systems

at Milestone 1 is the system concept paper (SCP). Milestones II and III require a decision coordinating paper (DCP). To begin a system, Milestone 0, the program needs only to become part of the program objectives memorandum (POM). These documents are reviewed by the SECDEF at which time a go-ahead is issued via Mission Needs Determination (MND). The integrated program summary (IPS) and the functional implementation plan (FIP) are also reviewed by the Secretary of Defense. The IPS is limited to 30 pages and includes such items as the program history, threat assessment, program alternatives, cost and cost track summary, procurement quantities, test and evaluation plans/summary, and the organizational and operational concept.

The FIP primarily discusses the method for implementation of the acquisition strategy: skipping phases, competition, second sourcing, sole source, proposed follow-on contracts, use of pre-planned product improvement (P³I) and industrial modification improvement program (IMIP).

Other documents which are updated throughout phases 0, I, and II are the test and evaluation master plan (TEMP), the integrated logistics support plan (ILSP), the life cycle cost (LCC) estimates, and the equipment/system specifications. Elements of the ILSP are further discussed in the next section.

D. ELEMENTS OF LOGISTICS

Understanding the nine logistics elements is a key to understanding the diverse subjects of the acquisition of any system. DODD 5000.1 states:

Logistic supportability shall be a design requirement as important as cost, schedule, and performance. A continuous interface between the program management office and the manpower and logistics communities shall be maintained throughout the acquisition process.

A discussion of the nine logistic elements and notable inter-relationships follows.

1. Maintenance Plan

The maintenance plan is the lead element because it promulgates the concept of maintaining the system. It is a focus for designing the system. For example, technical manuals must be written in consonance with the level of repair as stated in the maintenance plans and training schedules for maintenance personnel must be coordinated to ensure that the correct number of personnel with the required skills is available when the system enters the field/fleet. Other considerations include preventive and corrective maintenance skills and schedules.

2. Manpower and Personnel

Planning for the skill levels required for repair, operation, and installation as well as planning the required amounts of these personnel is necessary for the smooth, integrated operation of a complex system. For some DOD

systems today, manpower accounts for approximately 50% of the annual operating costs. Thus it is imperative to develop a design to minimize this cost.

3. Supply Support

Ensuring that repair supplies/parts are in the right place at the right time is the function of supply support. This element receives direction for development from the level of repair and type of repair (depot, intermediate, etc.) established in the maintenance plan.

4. Technical Data

This multi-faceted logistic element is one of the most difficult to manage. Technical data includes drawings (many different types and qualities), technical manuals, configuration management documentation, training manuals, repair and operating manuals. Configuration management is the most difficult to manage because of the ever-changing design and suppliers of parts.

5. Transportation and Handling

Transportation and handling must consider transporting vehicles, the packaging, and storage requirements. The size of the system or its components or restriction of size because of vehicle size limitations and the transportation environment should be observed in regard to transportation and handling.

6. Support and Test Equipment

Naturally test equipment must be designed to the level of repair of the system. In many cases, special test equipment must be newly designed. In other cases, the maintenance plan may specify designing in order to utilize general-purpose test equipment. Schedules for preventive and corrective maintenance should originate from the maintenance plan.

7. Training and Training Devices

The complex weapons of today more than ever require in-depth training and special training devices. To prepare personnel for operating such complex weapons systems, simulators, special courses, and unique training programs must be planned for and established. In some cases, training to operate special test equipment or to instruct personnel on repair procedures must be established. Training courses will have to consider the amount of operating personnel/manpower requirements. (Manpower requirement will have to consider the number of training instructors.)

8. Facilities

A variety of facilities is required for storage, testing, training, and operational shelters for the different types of weapons systems procured which may include aircraft hangars, submarine docks or transportable shelters. The maintenance (painting, cleaning, etc.) for these facilities must also be predetermined.

9. Computer Resources Support

Emphasis on software at the inception of a weapon system is as important as any of the other logistic elements. Software should be designed to facilitate efficient change (even at the expense of technical design efficiency) and should consider factors which reduce life cycle cost. These factors are selection of the language, designs of the system, inter-system and intra-system interfaces. Computer resources and management are thoroughly discussed in MIL-STD-1679.

E. MANAGEMENT CONTROLS

DOD Directive 7000.1 is the resource management system (RMS) which is designed to integrate DOD financial management with other DOD management systems for acquisition, inventory, and operations. This relationship is depicted in Figure 4. This section discusses several performance measurement subsystems of the selected acquisitions information and management system (SAIMS) as presented in Figure 5. The program, planning, and budgeting concerns of management are discussed in Section G of this chapter.

1. Cost/Schedule Control System Criteria (C/S CSC)

C/S CSC, as specified by DODI 7000.2, is used to evaluate the effectiveness of the contractor's internal systems. The C/S CSC does not require any data to be reported to the government but does provide for access

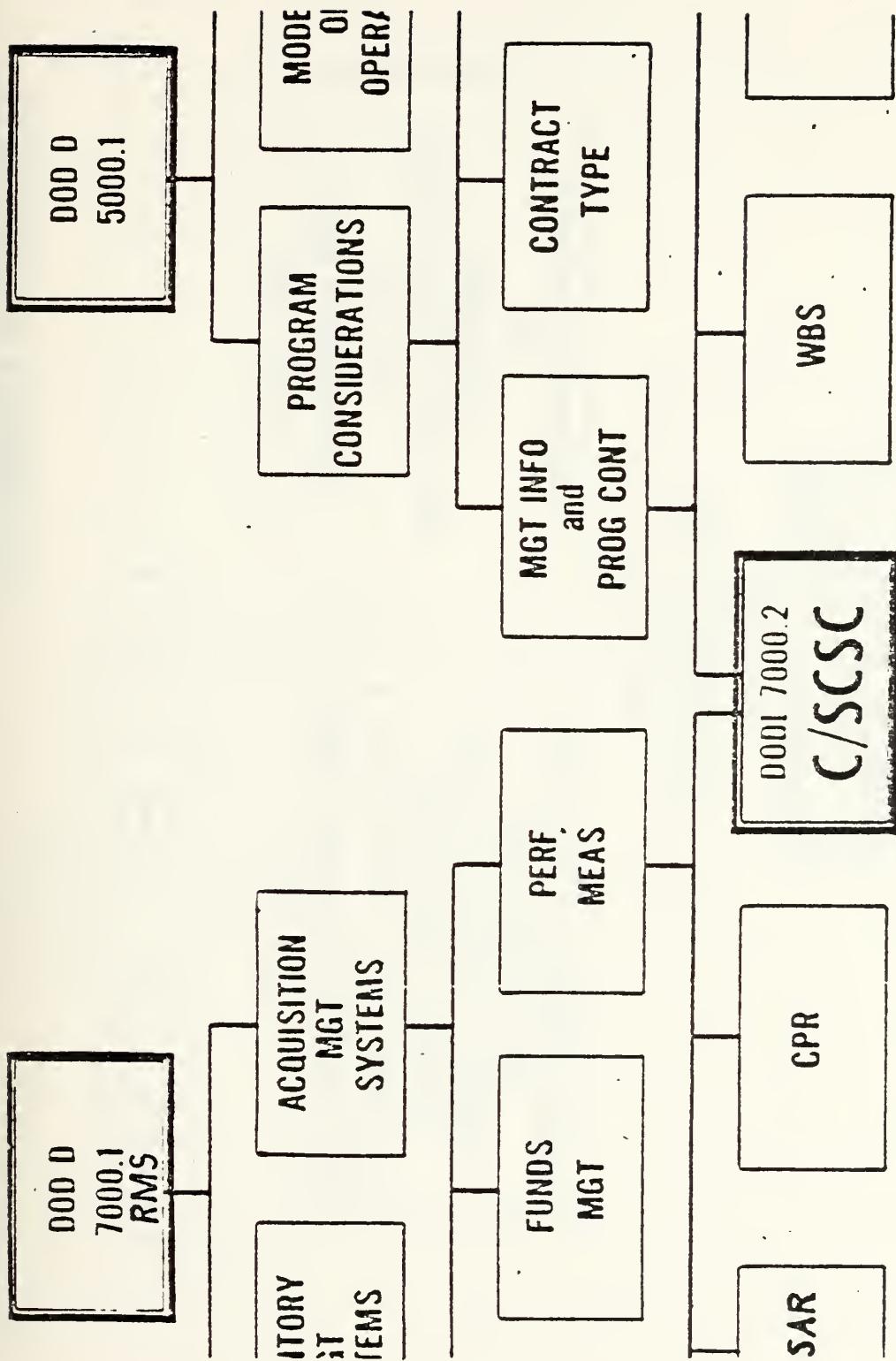


Figure 4. Integration of DOD Management Systems with the Acquisition Process.

PERFORMANCE MEASUREMENT

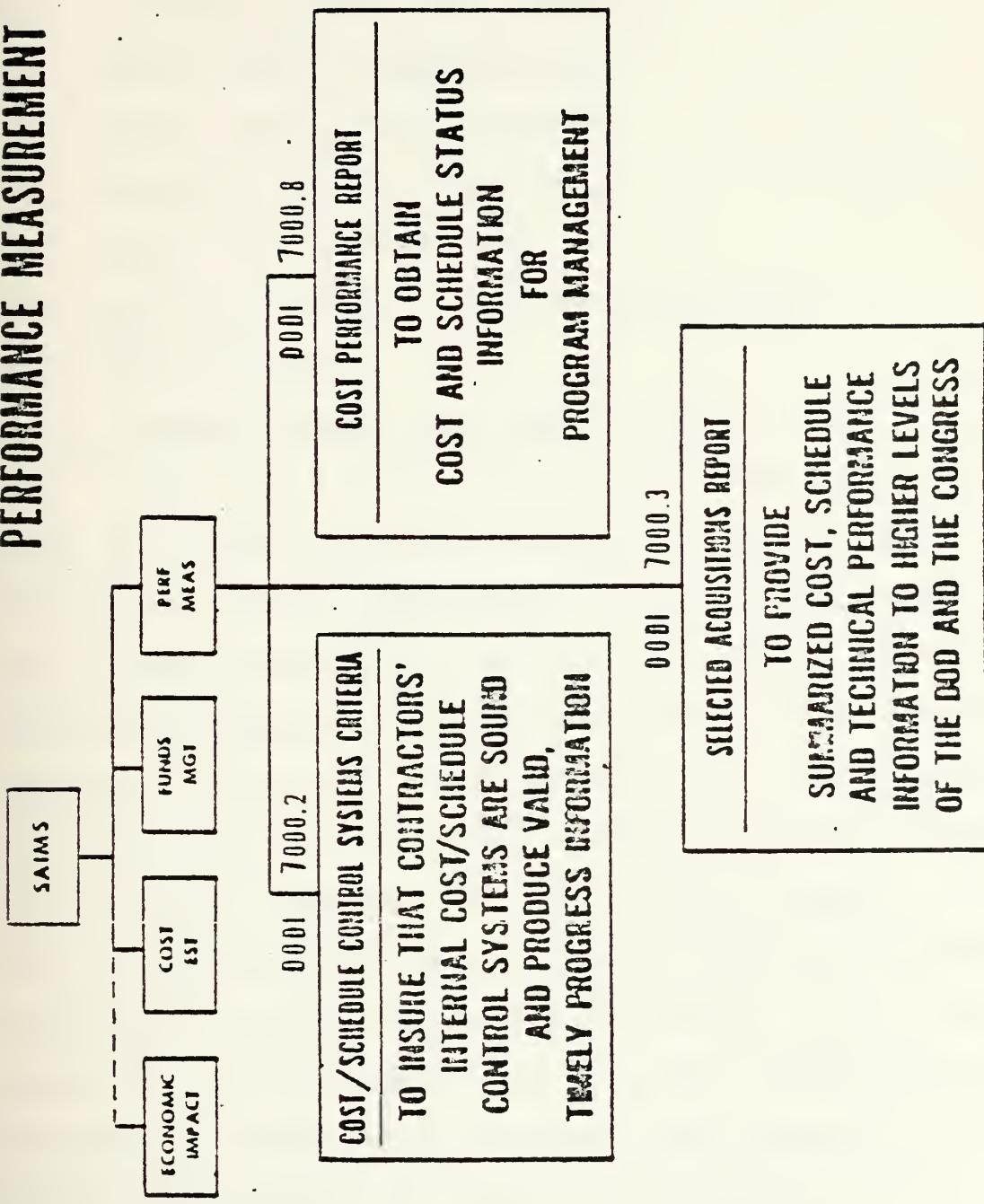


Figure 5. Relationship of SAIMS and Performance Measurement Subsystems.

to data needed to evaluate the system and monitor its operation during the life of the contract. Specifically the contractor's internal systems must provide:

- a. Budgeted cost for work scheduled
- b. Budget cost for work performed
- c. Actual cost of work performed
- d. Estimated cost of completion
- e. Budget cost at completion
- f. Cost and schedule variances-explanations
- g. Traceability.

2. Selected Acquisition Reports (SAR)

DODI 7000.3 is the controlling document that sets forth the Selected Acquisition Reports (SAR) Program. The SAR is the standard, comprehensive summary status report on major defense acquisition programs. This report reflects the program manager's current best estimate of performance, schedule, and cost goals and compares these estimates with baseline estimates established at DSARC Milestone II when the program was approved for full-scale development. The SAR is not designed to be a decision document but rather a standardized information reporting document. It is completed on a quarterly basis and forwarded to the Office of the Secretary of Defense which transmits these reports to the General Accounting Office and to the Congress.

SAR coverage is normally limited to those weapon system acquisition programs that are expected to experience

total cumulative financing for research, development, test and evaluation of over \$200 million or cumulative production investment in excess of \$1 billion. (SAR coverage may also be directed by the Secretary of Defense for programs of major interest regardless of expected financing requirement.)

The SAR's are formatted to address the following areas [Ref. 4: 2-2-2-27]:

- (1) References - display most of the programmatic information on the weapon system and include system description and mission.
- (2) Summary - briefly states the significant development from program inception and focuses on major events and changes since last report.
- (3) Operational/Technical Characteristics - list the quantifiable design goals and report demonstrated performance so far accomplished.
- (4) Schedule Milestones - provide information concerning key program milestones encompassing the entire period from program initiation to award of first full-scale production contract.
- (5) Program Acquisition Cost - summarizes all changes to both costs and quantities which have occurred since establishment of the program baseline.
- (6) Contractor Cost - reports contractor cost information on all active prime and associate prime contracts valued in excess of \$5 million.
- (7) Variance Analysis - summarizes the reasons for changes from the baseline values.
- (8) Budget Year and Out-Year Programs - provide a breakdown by fiscal year of program acquisition cost and escalation applicable to the "Budget Year" and "Balance to Complete" segments of the current estimate.

(9) Cost Quantity Curves - provide for recurring unit flyaway cost-quantity constant dollars.

The SAR provides analysts and researchers with a very useful tool. This document, referenced to an approved baseline, provides a comprehensive and continuous record of changes throughout a program evolution.

3. Cost Performance Reports (CPR)

CPR's, as specified by DODI 7000.8, are the vehicle which actually provides cost and schedule performance information to the DOD project office from the contractor. The CPR is a monthly report of contractual progress with identification of significant problems obtained through analysis of variances of previously prepared plans. It was reported by a defense analyst that DODI 7000.8 is seldom utilized as its efficacy is considered minimal and program managers rely on the contractor formats.

4. Work Breakdown Structure (WBS)

The WBS subdivides a total program into its component elements. It displays and defines the hardware elements or systems to be produced or developed. It utilizes an indenture level process to further subdivide components of a system into even smaller elements or systems. For management purposes, this indenture process may continue to three or four levels of hardware. These indenture levels should be directly related to the elements of C/S CSC and to the management organizational structure. This

relationship is presented in Figure 6. MIL-STD-881 describes the WBS, and deviation from MIL-STD-881 must be discussed in the IPS.

F. SOURCE SELECTION AND CONTRACTING

1. Source Selection

Contracting for a specific phase or several phases may occur depending on the acquisition strategy. In either case, the contracting process of a particular supplier, from source selection to negotiation of the final contract, will be similar to the following process.

The Department of Commerce publishes a synopsis of the contractual effort in the Commerce Business Daily (CBD). A number of large firms may respond to the CBD synopsis with expressions of interest. However, before the firm receives a request for proposal (from the procuring agency), it must be judged technically and managerially competent. The request for proposal includes further details about solutions or approaches desired, anticipated problems, and any other information which might be helpful in the development of a response (i.e., type of contract, etc.). The firm then provides a proposal to the procuring agency which is reviewed by an evaluation team.

The evaluation team is composed of several individuals or groups who represent areas of expertise essential to an in-depth and equitable evaluation.

WORK BREAKDOWN STRUCTURE

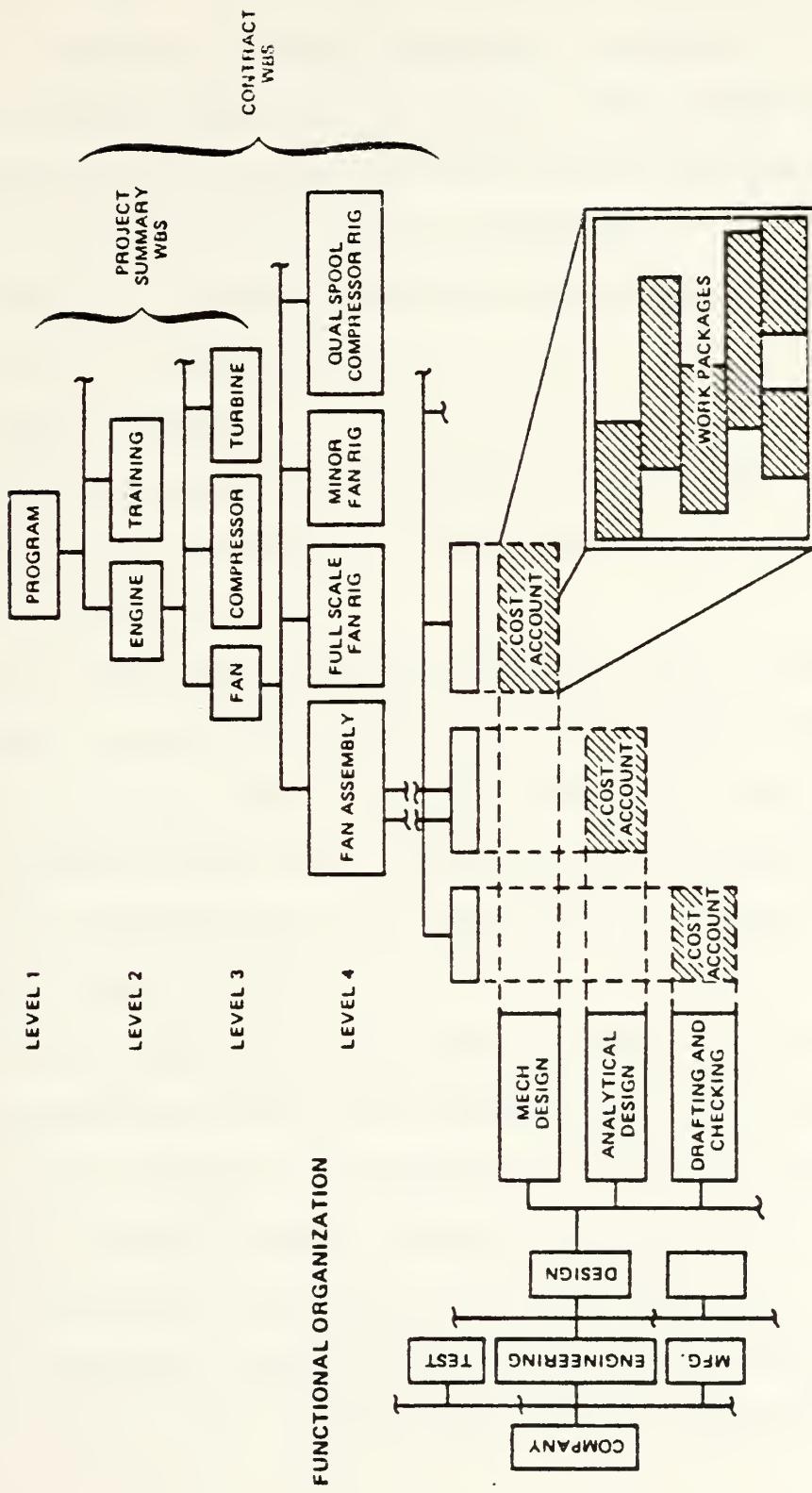


Figure 6. Relationship of the WBS Indenture level to the Management Organization Structure.

Typical evaluation criteria that the evaluation team includes (but is not limited to) are technical and production capability, past experience, management, the proposed technical approach or concept, and estimated costs. Weighing factors are applied to the criteria in order to obtain an overall ability level of the firm.

Finally, a contractor/firm is selected and the final contract is negotiated.

2. Contract Types

There are basically two types of contracts which a program manager may employ: fixed price contracts and cost-type contracts.

The fixed price contract maximizes the possible profit which a contractor (producer) can earn but also maximizes his risk. From the buyer's point of view, this type of contract offers low risk and minimum administrative requirements and motivates the contractor to produce efficiently [Ref. 5: 117].

On the other hand, cost-type contracts are used when it is impossible or unfair to arrange fixed price contracts. Here the buyer assumes the financial risk and the contractor agrees only to give his best efforts to complete the contract within the estimated cost provided in the contract. With cost-type contracts, however, the contractor is under no further obligation if, despite his efforts, the material

or service contracted for is not fully provided at the time he expends all the funds in the contracts [Ref. 3: 3-36].

a. Acquisition Phases and Contract Types

Fixed price contracts are recommended during the concept exploration phase (DSARC Phase 0) because the product (a paper report) is clearly established and because this type of contract provides the only means of placing competing contractors on an equal footing. However, the contract dollar amount for Phase 0 should be sufficient to pay for the work requested lest contractors spend their own funds in an attempt to "buy in."

Fixed cost contracts are also recommended for the Demonstration and Validation Phase (Phase I) for the same reasons as those presented for Phase 0. The argument is that, even though potential uncertainties (and therefore risks) are greater, equally funded competition overrides such risk.

During the full-scale development phase (Phase II), it is recommended that a cost-type contract be used. The justification offered is that the government must have the flexibility to make decisions with regard to technical uncertainties so as to achieve the best cost-performance-schedule compromises. The expected costs of corrections brought about by these technical uncertainties are always

fuzzy at the outset of Phase II and, correctly, a portion of the risk should be borne by the government.

Once the full development phase is completed and the design is firmly established, a fixed cost type is in order.

b. Fixed Price Contract Types

Types of fixed cost contracts include:

Firm Fixed Price (FFP) - The Buyer agrees to pay a specified price to the seller when the latter delivers what has been purchased.

Fixed Price with Escalation (FPE) - An FFP type contract except an escalation clause provides for either an upward or downward change in price as a result of changes in either material prices or labor rates relative to an economic index.

Fixed Price with Redetermination (FPR) - A contract wherein the amounts of labor and material are initially unknown but can be determined with limited production. A buyer contracts for a temporary price he believes to be high but receives protection from still higher prices. After an agreed-upon percentage of work has been completed at the temporary price, the contract price is redetermined based upon data from production to date. The buyer expects the redetermined price to be lower (perhaps because of learning or expected future volume).

Fixed Price Incentive (FPI) - The FPI is a variation of a redeterminable type contract designed to incentivize production efficiency via a target price, a ceiling price and variable profit formula [Ref. 5: 117-118].

2. Cost-Type Contract Types

A listing of cost-type contracts includes:

Cost Plus Incentive Fee (CPIF) - This type is a variation of an FPI type contract where buyer and seller agree beforehand on a tentative fee based on estimated cost. If the seller can reduce costs below the agreed-upon estimated costs, buyer and seller

share the reduction. Regardless, all costs are paid by the buyer.

Cost Plus Award Fee (CPAF) - This type is an offshoot of a CPIF contract wherein the fee consists of two parts: a fixed amount which does not vary with contract performance and an award amount intended to be sufficient to provide motivation for excellence in contract performance in areas such as quality, timeliness, ingenuity and cost effectiveness.

Cost Plus Fixed Fee (CPFF) - A contract type that provides the seller with reimbursement for all allowable costs up to a stated amount plus a fixed fee calculated as a percentage of the originally estimated cost [Ref. 5: 120-121].

d. Risk as a Function of Contract Type

By way of summary, Figure 7 depicts the relative risk assumed by the government and the contractor as a function of contract type.

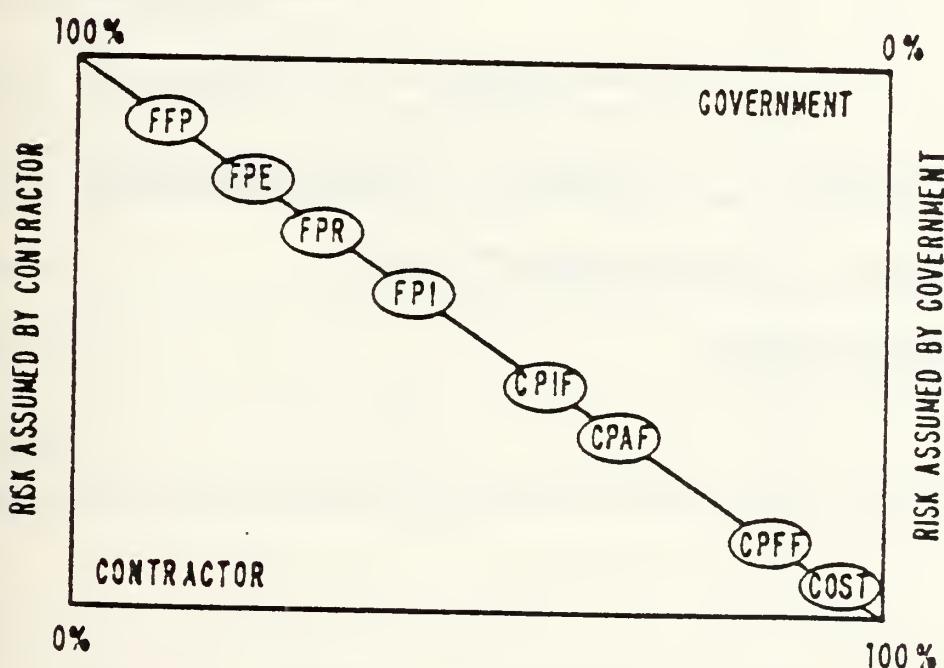


Figure 7. Degree of Risk as a Function of Contract Type

G. PLANNING, PROGRAMMING AND BUDGETING SYSTEM

1. Federal Budget Process

Before presenting the Planning, Programming and Budgeting System (PPBS), the more general budget process will be briefly addressed. The purpose of the federal budget process is to allocate scarce national resources among competing public demands [Ref. 6: A-3]. Figure 8 depicts the main three phases of the process: (1) Executive Formulation, (2) Congressional Enactment, and (3) Budget Execution. In the Defense Department, Executive Formulation is carried out in a PPBS context.

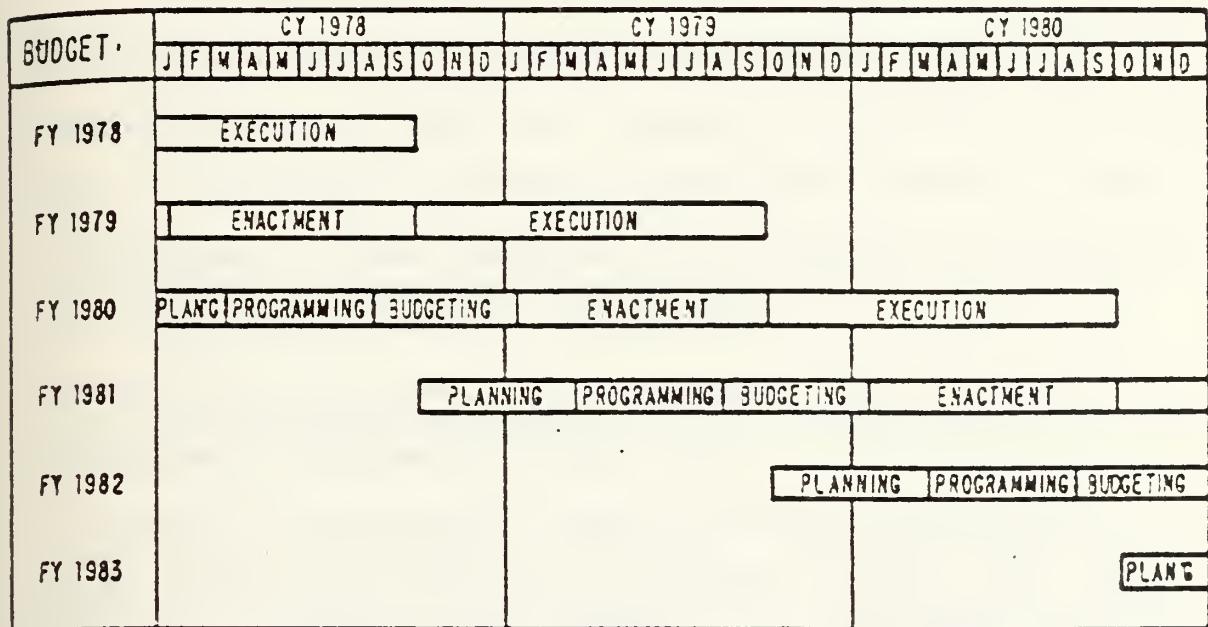


Figure 8. Phases of the Federal Budget Process.

It is important to recognize that each of these main phases interrelates and overlaps. For example, a Defense Department program manager would have been concurrently involved in executing (spending) the Fiscal Year (FY) 1979 budget appropriations, testifying before Congress in support of the FY 1980 budget enactment, and planning for the FY 1981 budget. All this would have been transpiring during the month of February, 1979.

Note also that within each budget cycle there is a two-year time delay from the initiation of budget planning until the beginning of the execution phase.

2. PPBS Concepts

McKinney and Howard state that PPBS provides a method or approach whereby "objectives and resources and their interrelations are taken into account to achieve a coherent whole. Three major concepts underlie PPBS" [Ref. 7: 3267].

Development in [an] emergency of an analytical capability to examine in depth both agency objectives and the various programs to meet the objectives;

Formulation of a multi-year (at least five years) planning and programming process coupled with a sophisticated management information system; and

Creation of an improved budgetary mechanism that can facilitate broad program decisions, translate them into more refined decisions in a budgetary context, and then present the results for executive and legislative action.

The PPBS approach is premised on questions such as the following:

What are the basic goals and objectives being sought?

What are the alternative means for achieving the stated goals and objectives?

What are the comprehensive costs (present, future, and full) of each alternative, both in financial and non-financial terms?

What are the benefits to be achieved from each alternative and how effective will each be in achieving the stated goals and objectives?

3. Department of Defense PPBS Process

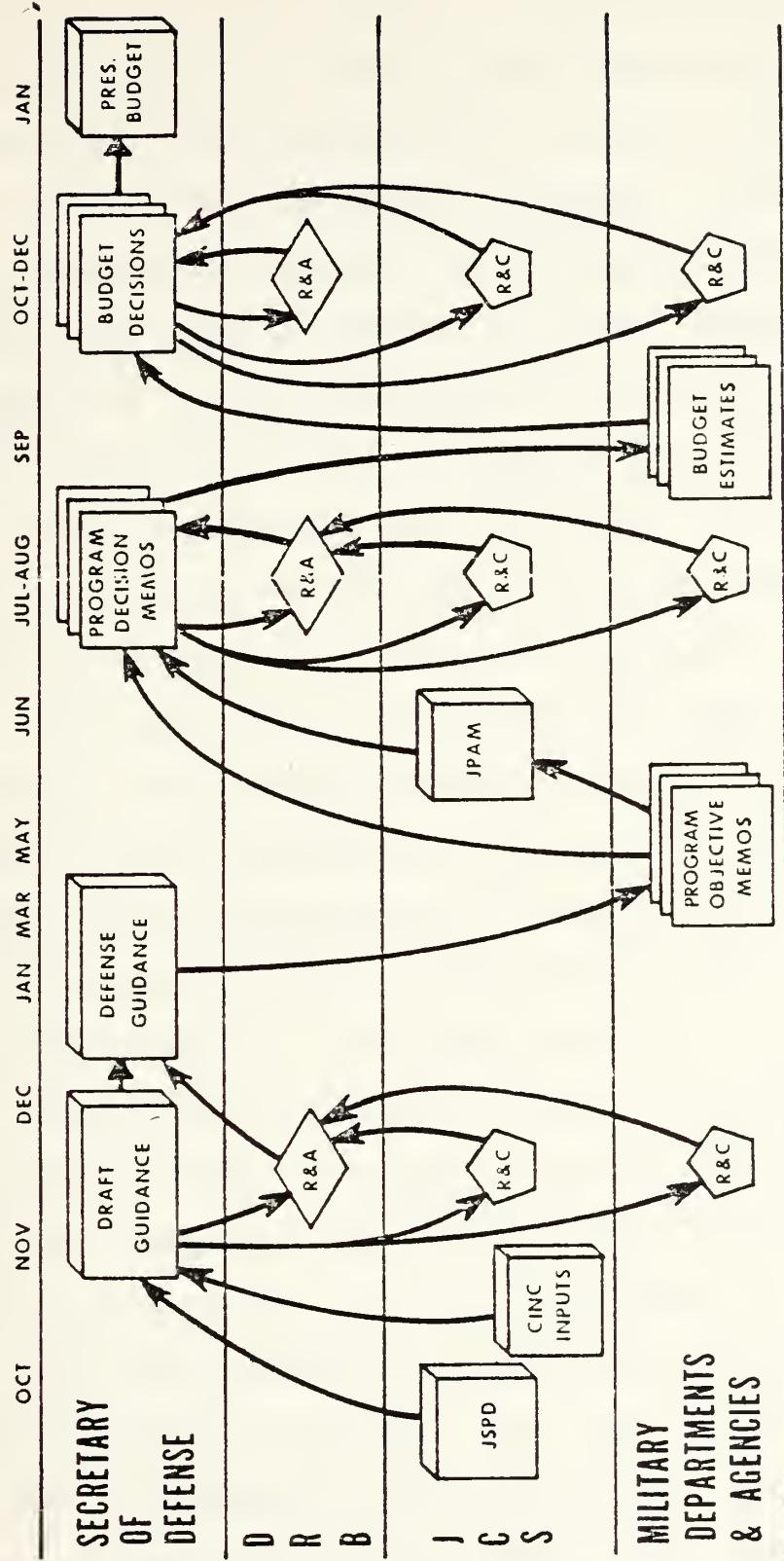
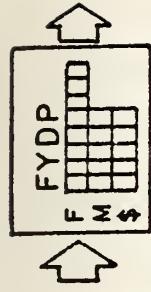
In keeping with concepts discussed above, the Department of Defense instituted PPBS in the early 1960's. The goal was to facilitate budgeting in terms of forces and systems rather than resource categories [Ref. 8: 71]. The progression is from general articulation of national military strategy and objectives to specific programs, organizations and forces necessary to carry out the strategy and objectives.

A model for viewing the Department of Defense PPBS is provided in Figure 9 [Ref. 9: 7].

The planning phase of PPBS is initiated with submission of the Joint Strategic Planning Document (JSPD) and ends with issuance of the Consolidated Guidance.

The JSPD provides the views of the uniformed military Joint Chief of Staff on policy objectives, national military strategy, and force levels. The JSPD is not fiscally constrained and is based on short-, mid-, and long-range intelligence studies. This document is published in early fall and is an input into the Consolidated Guidance.

• PLANNING • PROGRAMMING • BUDGETING



DRB = DEFENSE RESOURCES BOARD

ISPD = JOINI STRATEGIC PLANNING DOCUMENT

JPAM = JOINT PROGRAM ASSESSMENT MEMORANDUM

CINC = COMMANDERS-IN-CHIEF UNIFIED AND SPECIFIED
COMBINED

COMMANDS

R&C = REVIEW AND COMMENT

R&A = REVIEW & ADJUST M = MANPOWER
 R&A M \$ □
 □ = YEARS

Figure 9, DOD Planning, Programming, and Budgeting Process

The Consolidated Guidance is prepared for the Secretary of Defense by the Assistant Secretary of Defense (Program Analysis and Evaluation) with inputs from throughout the Office of the Secretary of Defense. The Consolidated Guidance contains a statement of fundamental policy and rationale underlying the defense program. Programming and fiscal guidance are also included to provide the services with the information needed to develop their programs. After a draft is discussed with the Joint Chiefs of Staff and with the Service Secretaries, a revised Consolidated Guidance is released to the Services in March.

The Program Objectives Memorandum (POM) is the programming link or bridge between planning and budgeting. It is here, in the programming phase of PPBS, where a program gains approval for development by standing up to competition against alternative means of accomplishing the same purpose and alternative uses of the same resources.

The POM is a definite statement on how the service intends to carry out its responsibilities with respect to the national strategy. The "how" is constrained by the fiscal guidance in the consolidated guidance.

The POM is transmitted to the Secretary of Defense via the Joint Chiefs of Staff. The Joint Chiefs review the POM's (one is prepared by each service) and write the Joint Program Assessment Memorandum (JPAM). This memorandum is

the Joint Chiefs' of Staff view on the risk associated with the POM. (Remember that the POM is fiscally constrained whereas the JSPD was not.)

After the POM and the JPAM are received, the Secretary of Defense reviews the memoranda and identifies alternatives for those issues where the Office of the Secretary of Defense and the Service differ. After the Joint Chiefs and the services have an opportunity to reclama, the Secretary of Defense issues the Program Decision Memorandum (PDM). The PDM is the Secretary of Defense's decisions on acquisition programs, force levels, and levels of support. The issuance of this PDM is the end of the programming phase of PPBS.

Upon receipt of the PDM, the service prepared firm budget estimates of the cost of the programs approved in the PDM. These budget estimates are sent directly to the Office of the Secretary of Defense for further analysis.

The Secretary of Defense holds budget hearings with the Services, Joint Chiefs of Staff and the Office of Management and Budget. Following these hearings, the Secretary formulates his budget decisions. These budget decisions are then submitted for incorporation in the President's budget which is submitted to the Congress.

4. Five-Year Defense Plan

The Five-Year Defense Plan (FYDP) is an official Office of the Secretary of Defense publication which

summarizes the approved plans and programs of the Department of Defense components. More simply stated, it is the management information system (database) that supports the PPBS. The FYDP records, summarizes and displays budget decisions that have been approved by the Secretary of Defense. The FYDP is structured as modeled in Figure 10 [Ref. 6: A-8].

This structure allows different aggregations of data that would be meaningful to different managers. For example, a researcher or analyst seeking information in research and development budgets would query this PPBS database by defining the year of interest and (X, Y, Z) coordinates. He would find the needed information under: (RDT&E appropriations, general purpose forces, planes or whatever).

The FYDP is updated in October, after Congressional action on the appropriations bill, in January after the President submits his budget and in May based on the POM [Ref. 6: A-9].

FIVE YEAR DEFENSE PROGRAM

The FIVE YEAR DEFENSE PROGRAM is a relationship of inputs and outputs
 There are approximately 1400 outputs known as PROGRAM ELEMENTS
 The elements are divided into 10 mission segments known as MAJOR FORCE PROGRAMS
 The input financing is in 5 categories known as DEFENSE APPROPRIATIONS

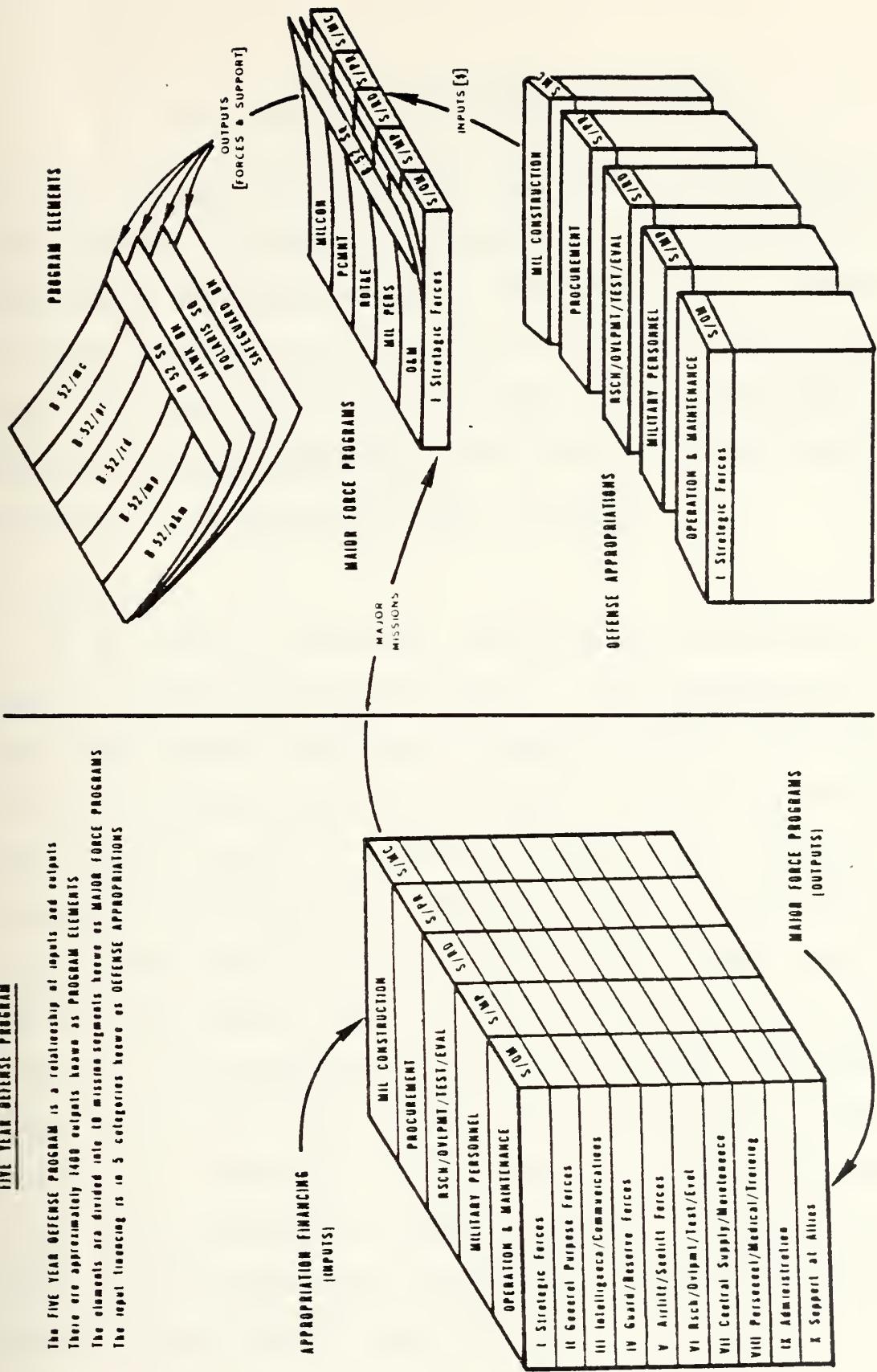


Figure 10. The Five-Year Defense Plan Data Base

III. HISTORY OF ATTEMPTED SOLUTIONS

This chapter is a historical discussion of cost growth, highlighting past attempts to manage it. This historical evolution is an integral part of this thesis as it supports the final conclusion that the past attempted solutions to cost growth have focused on the wrong problems and have used an ineffective approach. The following discussion is presented in chronological order by decade.

A. THE 1940'S

In the 1940's, the Hoover Commission was established to examine the DOD acquisition process. Its recommendation urged that budgets submitted to Congress reveal the purpose for which requested funds were needed. The acquisition process at this time was a function of each of the service's own methods of procurement. The first policy for unification was presented July 26, 1947, when President Truman signed the National Security Act, creating the Department of Defense. An orderly and integrated planning, programming and budgeting system such as the one used today was not manifest in the 40's or 50's. However, in 1949, James V. Forrestal, appointed as the first Secretary of Defense (SECDEF), created a uniform budget structure but left planning and budgeting to the discretion of each service [Ref. 10: 15].

B. THE 1950'S

In the early 1950's, the concept of program management was promulgated through the Air Force's popular "375 Series," which originated for the missile space programs and where failure could not be tolerated. With the rapidly advancing technology,

...money was authorized to develop almost any new defense system that appeared capable of giving the United States a performance advantage over any potential adversary [Ref. 10: 9].

Additionally, it was President Eisenhower's policy to replace a reduction of forces with modern arms [Ref. 11: 200].

The Budget and Accounting Procedures Act of 1950 sought to carry out the Hoover Commission recommendation by requiring an executive budget based on governmental functions and activities. The problem with this legislation was that "...the terms 'program,' 'performance,' 'activity,' and 'function' are all used more or less interchangeably" [Ref. 12: 34].

The famous Peck and Scherer of the Harvard University Graduate School of Business analyzed twelve typical weapons systems programs of the 1950's in which "the average cost growth was found to be 220 percent beyond the original target cost" [Ref. 13: 5]. Most contracts during this period were cost reimbursement for development and production. Engineering design was not a major consideration for, when a design encountered problems in production or in the field, it was modified via government-funded engineering changes.

In the late fifties, consideration of should-cost, design-to-cost, and life cycle costs emerged. The government, from Congress to procuring agencies, began closer scrutinization of Defense contractors. The reason for this scrutinization was due to the high risks and costs associated with some programs, especially the ballistic programs, most of which were sole source contracts.

C. THE 1960'S

Throughout most of the 1960's, the Secretary of Defense was Robert S. McNamara (the whiz kid of Ford), who served under Presidents Kennedy and Johnson. McNamara was responsible for centralizing authority and planning for DOD at the OSD level through the five-year defense programs, originally known as the Five-Year Force Structure on Financial Plans.

In 1962, the Harvard Weapons Acquisition Project Report on 12 major defense systems showed that costs were averaging as much as seven times more than originally estimated. In 1965, as ASD(C), Dr. Robert N. Anthony developed the Resource Management System (RMS) as a tool to bring the accountability feature into the PPBS. The Systems Acquisition Information and Management Systems (SAIMS), which included SARS, Cost Performance Reports (CPR), and Cost/Schedule Control System Criteria (C/S CSD), came into existence. These relationships are shown in Figure 11. Systems analysis, life-cycle-costing (LCC), should-cost analysis, and total package procurement

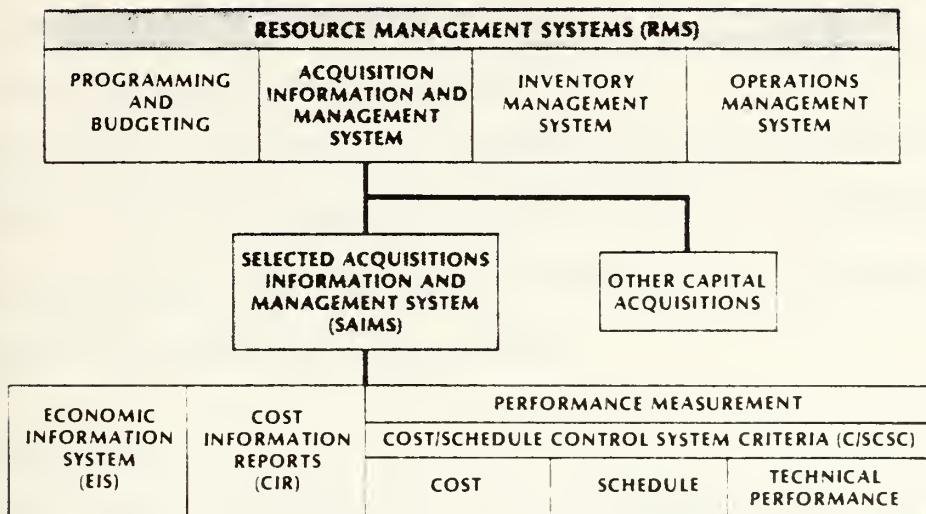


Figure 11. Relationship of SAIMS to RMS.

were promoted during this period. During the 1960's, hardware competition in the development phase was rare "because of the Advanced Prototype Program which provided dollar incentives for the Services to opt for an acquisition strategy involving competition" [Ref. 8: VI].

In 1968, SECDEF began the annual issue of logistic guidance and 18 other guidance memoranda, some of which included:

- development of integrated logistics support plans,
- proposal evaluation and source selection,
- defense standardization programs,
- quality assurance programs,
- value engineering programs,

- technical data management,
- configuration management, and
- work breakdown structuring.

At the end of the 1960's, President Richard M. Nixon appointed Melvin R. Laird as SECDEF and David Packard as DSECDEF, and with them began a new decade of changes to the acquisition process and organizational design.

D. THE 1970'S

The 1970's started with the 10 Packard initiatives presented in Figure 12 which were soon codified in the formal policy documents, particularly in Department of Defense Directive 5000.1, Major Systems Acquisitions, and a series of supporting DOD directives and instructions issued soon afterward [Ref. 14: 2].

Apart from inflation and changes in quantity, the major drivers of cost growth for the programs of the 1970's were schedule changes, engineering changes, and estimating errors [Ref. 14: VIII].

A Rand report, indicates that the seventies were much more successful in controlling cost growth than the sixties [Ref. 5].

Under Packard, OSD assumed the role of monitor and decision maker at Milestones I, II, and III for major systems only at DSARC's. Concerning cost growth, Packard engaged in discussion with the Industry Advisory Council, a cross-section of industry representatives and discovered many

FIGURE 12.
THE PACKARD INITIATIVES: MAJOR POLICY ELEMENTS

1. Provide for systematic program reviews at important decision milestones by a group of senior officials in the Office of the Secretary of Defense (establish the DSARC--the Defense Systems Acquisition Review Council).
2. Improve program cost estimates and provide OSD with an independent source of such estimates by estimating a Cost Analysis Improvement Group (CAIG) within OSD.
3. Design to cost: establish a cost goal as one of the primary program objectives, equal to schedule and performance in importance; design with operation and support costs in mind as well as production costs (life cycle costing).
4. Increase testing objectivity by establishing agencies for operational test and evaluation (OT&E) independent of the Service commands responsible for development of new systems.
5. Improve the training of program managers by establishing military training courses and schools to prepare them for the job.
6. Improve training of program managers by establishing military training courses and schools to prepare them for the job.
7. Attract superior officers to program management, in part by providing them with superior promotion opportunities.
8. Reduce the turnover rate of program managers so that they have longer job tenure.
9. Resolve technological uncertainties during development, not during production (hence emphasize earlier and more complete hardware testing and reduce "concurrency"--the overlap between development and full-rate production).
10. Encourage competitive hardware developments to reduce risk and stimulate contractor efforts; where feasible, use prime-contractor competition through full-scale development to avoid developer monopoly at the time the initial production contract is negotiated.

problems he later attempted to solve. Packard discontinued use of the total package procurement, developed in the 60's, and created the Cost Analysis Improvement Group (CAIG) before he left office in 1972. In December 1972, the Commission on Government Procurement presented 149 recommendations, 82 of which required executive action and 67 of which required legislative action by the Congress [Ref. 6]. During this era, DOD considered design-to-cost and life cycle cost (LCC) as important in the acquisition strategy because dollars spent prior to production could save significant after-production, operation and support dollars.

In 1976, the National Security Industrial Association (NSIA) determined that LCC could not become a quantitative consideration until more emphasis was placed on mean-time-between-failures, unit price, and required operation and maintenance personnel. Other items reported by NSIA included problems such as excessive requirements, underestimating, over-optimism, unrealistic costs and schedules, buying-in, over-control of industry and change orders. As a result, ASD William P. Clements required 59 program managers to report their status to him directly on a monthly basis. This action helped create some constructive actions within the overall acquisition process; however, when Clements left in 1977, this reporting procedure was discontinued [Ref. 10: 48].

In 1975, Clements established the Acquisition Advisory Group to examine and access the Army, Navy/Marine Corps and Air Force recommendations concerning management of defense systems acquisition at the OSD level. Many recommendations were made and several were enacted. In 1976, the Office of Management and Budget (OMB) issued OMB Circular A-109, which was patterned after DOD directives of the 5000 series. Also in 1976, Zero Base Budgeting was enacted and a four-step source selection process was enacted through a revision of DOD Directive 4105.62 (Selection of Contractual Sources for Major Defense Systems).

By this time, so many DOD policies, directives, and instructions proliferated that the Aerospace Industries Association (AIA) published a list of desirable characteristics of government documents to assist in the review of the plethora of regulations, shown in Figure 13.

Figure 14 is a presentation of the numerous studies and revisions to existing documents of the weapons systems acquisition process which were completed this decade.

E. THE 1980'S

The 1980's began with the coining of a new term for evaluating weapons systems--"affordability"--which soon lost its momentum [Ref. 15].

Five working committees, chartered by Deputy Secretary of Defense Frank C. Carlucci, to improve the acquisition

FIGURE 13.
DESIRABLE CHARACTERISTICS OF GOVERNMENT DOCUMENTS

Government documents should:

1. Recognize that no two programs are identical.
2. Recognize that good management depends primarily upon the judgment of competent people having appropriate authority.
3. Contain realistic objectives.
4. Recognize that risk is an inherent part of the defense system development effort.
5. Motivate government/industry personnel to achieve overall program objectives.
6. Permit contractor management flexibility.
7. Specify what is needed, not how to achieve it. The need should be known early in the program.
8. Contribute to trust and candid communication between the government and industry—the customer and the contractor.
9. Strengthen the program manager's role and clarify the lines of authority, responsibility, and accountability.
10. Discourage "cookbook" approaches.
11. Recognize that acquisition begins with description of objectives rather than the objects.
12. Recognize the desirability of a number of different system solutions (options).
13. Avoid premature introduction of detailed requirements.
14. Allow contractors to propose the technical approach, the main design features, the subsystems, and the alternatives to schedule, cost, and capabilities.
15. Emphasize the contractor's role in tailoring to the minimum essential specifications, standards, management systems, and data.
16. Place greater reliance on meaningful competition, i.e., demonstrated performance rather than paper promises.
17. Recognize the need to increase the accuracy and credibility of cost estimates when hardware demonstration is proposed.
18. Preclude "technical leveling" and "cost auctioning."
19. Shorten, or do not unnecessarily lengthen, the acquisition process.
20. Encourage cost-effectiveness trade-offs.
21. Authorize the use of contractors' data formats.
22. Allow contractors to determine the requirements to be placed on their suppliers.
23. Tend toward reduced government surveillance.
24. Not duplicate the policy/requirements of other documents.
25. Be consistent with OMB Circular A-109.

Source: AIA Aerospace Technical Council, 1978.

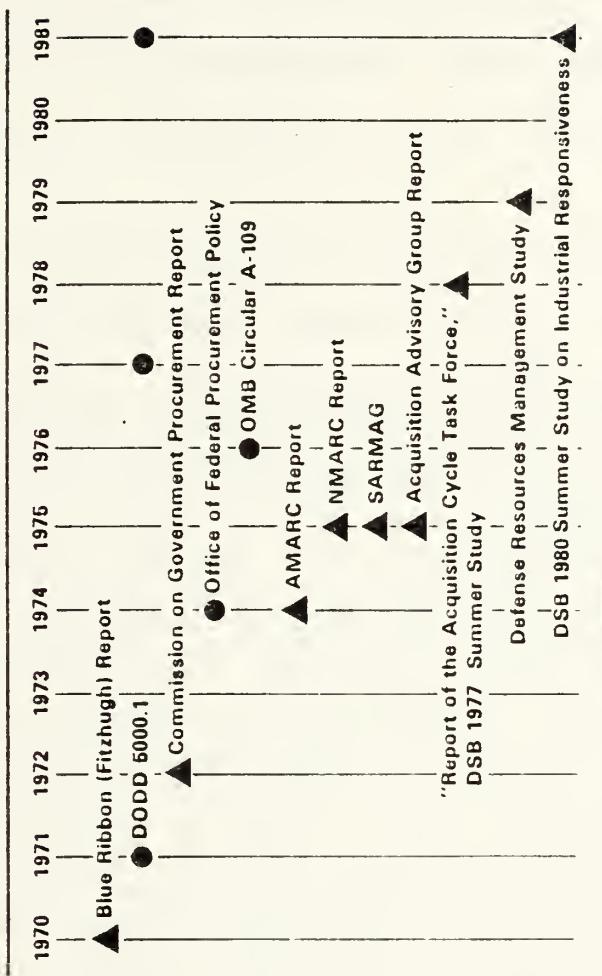


Figure 14. Major Studies of the Acquisition Process.

process delivered 32 initiatives, presented in Figure 15, which were implemented by OSD in March, 1981. Less than a year later, these initiatives were revised through a grouping process and were subsequently reissued [Ref. 16: 54-70].

DODD 5000.1 has again been revised, eliminating review channels for Milestone I and creating a transition phase between the full-scale development phase and the production deployment phase. Other important documents are in revision status.

In order to provide better control in the cost area, Congress enacted the 1982 Defense Authorization Act.

In the fiscal year 1982 Defense Authorization Act, a two-tiered reporting requirement was established to identify programs that have significant unit cost growth. The purpose is to provide a means by which Congress can become aware of cost growth early enough to take remedial action. The baseline for the reports is the cost presented in the March 1981 SAR. The so-called Nunn Amendment requires that service secretaries report the following information: programs in which the total acquisition unit cost is over 15 percent above the level of March 1981; and programs for which the procurement unit for fiscal year 1982 is over 15 percent above the level of March 1981. If unit costs exceed the baseline by 25 percent or more the Secretary of Defense must make a written certification pertaining to the systems requirement within 30 days after the report by the service secretary. All thresholds are measured in current rather than constant dollars. Authority to obligate funds for a program is automatically terminated if the service secretary does not submit a report within 30 days or if the Secretary of Defense fails to certify the system requirement within 60 days of the reported breach [Ref. 17: 7].

"In December (1981), 23 systems exceeded the 15 percent threshold, some by as much as 50 percent" [Ref. 17: 7].

FIGURE 15.
THE CARLUCCI ACQUISITION IMPROVEMENT ACTIONS

1. Reaffirm Acquisition Management Principles
2. Increase Use of Preplanned Product Improvement
3. Implement Multiyear Procurement
4. Increase Program Stability
5. Encourage Capital Investment to Enhance Productivity
6. Budget to Most Likely Costs
7. Use Economical Production Rates
8. Assure Appropriate Contract Type
9. Improve System Support and Readiness
10. Reduce Administrative Costs and Time
11. Budget for Technological Risk
12. Provide Front-End Funding for Test Hardware
13. Reduce Governmental Legislation Related to Acquisition
14. Reduce Number of DOD Directives
15. Enhance Funding Flexibility
16. Provide Contractor Incentives to Improve Reliability and Support
17. Decrease DSARC Briefing and Data Requirements
18. Budget for Inflation
19. Forecast Business Base Conditions
20. Improve Source Selection Process
21. Develop and Use Standard Operation and Support Systems
22. Provide More Appropriate Design-to-Cost Goals
23. Implement Acquisition Process Decisions
24. Reduce DSARC Milestones
25. Submit MENs with Service POM
26. Revise DSARC Membership
27. Retain USDRE as Defense Acquisition Executive
28. Raise Dollar Thresholds for DSARC Review
29. Integrate DSARC and PPBS Process
30. Increase PM Visibility of Support Resources
31. Improve Reliability and Support
32. Increase Competition

Presently DOD is busy defending itself from the onslaught of investigations initiated by Congress from concern over the present size and predicted growth of DOD's portion of the budget. These investigations typically culminate in Congressional hearings.

F. OBSERVATIONS

The following observations are drawn from the previous review:

1. Each administration is marked by its development of a new series of specifications, standards, and methods to minimize and control costs.
2. Each administration has altered its budget interaction process.
3. Each administration has revised its organizational structure.

It is apparent from the above observations that a plethora of heroic patches to the acquisition and budgeting process has been developed, few of which have shown any significant positive results. Cost growth still exists.

Future options concerning cost growth include continuing to:

- research the subject to death,
- observe continual cost growth year after year,
- develop more patches for the acquisition process.

Other options are to wait for Congress to control DOD spending through ceiling limitations, or DOD could regain

credibility by recognizing where its faults lie and solving its own problem.

G. CONCLUSIONS

This chapter has shown that a successful method to control cost growth has not been found.

IV. SUCCESSFUL MANAGEMENT PRINCIPLES

This chapter is divided into two basic sections. The first is a discussion of management principles as they relate to organizational design. These principles are incorporated in Chapter V to surface the discrepancies between the acquisition process as it now exists and static principles of successful organizational design. Sources for these principles are many, and each author appears to have a slightly different viewpoint. Likewise, the following is the researcher's rendition of management principles. The second section of this chapter is an amalgamation of the principles, discussing what a good manager should do.

A. STATIC PRINCIPLES OF ORGANIZATIONAL DESIGN

This section is an amalgamation of static principles for organizational design compiled and assembled by the researcher, using the many renowned authors versed in this topic. The static principles of organizational design to be employed in later chapters are as follows:

1. Span of Control

This is a number which measures how many people report directly to a common manager. This once was thought to be approximately seven as this was believed to be the maximum number of people a superior could effectively manage [Ref. 39: 47].

This corresponds to the natural abilities of a human mind being capable of considering only five to seven topics at once. Variances to this number alter the effectiveness of the manager. An increase effects less control; a decrease effects more control.

2. Clear Goal Setting

This is the principle of every suborganization establishing objectives (goals) which enhance and supplement the primary organization's goals. Goal achievement is monitored by realistic performance indicators, not an abundance of performance indicators but only a few which accurately represent the organization's goals.

This management principle is the single most important principle of them all although a review of the literature suggests it is most often overlooked. Without this principle, the organization has no raison d'etre. The amount of awareness of the goals by the organization's members is proportional to the effort directed toward the achievement of the goals. Thus it is upper management's responsibility to clearly communicate these goals to sub-organizations.

This principle fringes on the often discussed clarity of delegation principle which espouses that a manager should clarify whether he desires a subordinate to look into a problem, take action, or respond somewhere in between. However, for the purpose of this thesis, goal setting as a principle will be adequate.

3. Unity of Command

This is the rule that each person in the organization should have one and only one direct superior to whom he or she is accountable on any aspect of the job. The principle is central to the concept of command.

In practice, the close interplay between line and staff roles in a functional organization sometimes requires that an employee be responsible to several persons in fulfilling his or her complete job requirements. This is acceptable practice provided the employee's supervisors do not have overlapping authority over any set of common tasks, thus creating the possibility of conflicting directives with respect to a given task [Ref. 19: 355].

4. Short Chain of Command

This principle maintains that the number of distinct management levels in the hierachial chain of command should be kept as small as possible. The phrase "as small as possible" is relative to the size of the organization. It connotes the elimination of unnecessary levels of management which impede effective decision making. The benefits of this rule are accurate communication and quick response time to directives [Ref. 20: 26].

5. Complete Delegation

This is the principle that each manager must have adequate responsibility and authority to perform his job.

In turn, he is 100% accountable for the performance of his job within the realm of his responsibility and authority. The fruitfulness of this rule requires that responsibility equal authority and vice versa.

Successful use of the next rule, the exception principle, is contingent on complete delegation.

In evaluating the size of bureaucracies today, one notices that the most important resource of the organization is its people. Studies have shown that when faith is placed in people, they will perform to the ability they perceive top management expects (Theory Y). This is one of the hypotheses which make organizational development a successful science.

6. Management by Exception

This is the rule which allows routine decisions to be made at the lower levels of management while decisions which are beyond the scope of the responsibility and authority of the lower level management rise to upper management. This is the rule managers fear the most for, if they delegate too much of their decision making responsibility, they feel they will lose their power base. In actuality, it frees the executive to fully evaluate the consequences of the more difficult decisions with which he should be concerned. Practice of this principle complements the short chain of command principle when used harmoniously with the complete delegation principle.

7. Maintenance of Resources

This principle holds that an organization should take care of its resources. Resources include financial status, equipment, facilities and, most importantly, people. The focus of this discussion will be on people as they are responsible for the other resources. An organization must show that it is genuinely concerned for its people before the people respond with commensurate concern for the organization. Maintenance of people requires hygiene factors (prestige and pay) as well as motivational factors (job satisfaction, recognition, control in job, achievement and growth). For efficient use of people, these factors must be adjusted on an individual basis. The discussion of OD will provide more details on this balance.

The next three principles are necessary for organizational design but have less to do with management techniques than the previous rules as they are more structurally dependent than the above seven principles.

8. Specialization

This rule pertains to the organizational structure/design and includes functional, task, process and geographic designs.

9. Balance

This is the rule to determine the size of administrative units within the organization so that they are geared

toward equivalent outputs using equivalent resources

[Ref. 20: 29].

10. Decentralization

This is the organizational philosophy of placing the decision making process at the structurally convenient location in the organization. It is similar to the exception principle and complete delegation principle except that it is structurally dependent [Ref. 20: 30].

None of the above principles works independently of the others.

At this point, it must be mentioned that static principles are sufficient for a stable and static organization but today's environment, like the past and the future, are dynamic. As a minimum, the most stable organizations have turnover with which to contend.

These dynamics of an organization should never be neglected. OD is a science which considers at all times the change in the environment and the organization as fully described in Chapter VI.

B. WHAT MANAGERS SHOULD DO

The researcher Henry Mintzberg, of Canada's McGill University, made one of the few rigorous studies of how effective managers use their time. They don't regularly block out large chunks of time for planning, organizing, motivating, and controlling, as most authorities suggest they ought. Their time, on the contrary, is fragmented, the average interval devoted to any one issue being nine minutes. Andrew Pettigrew, a British researcher, studied the politics of strategic decision making and was fascinated by the internal properties of organizations. He

showed that companies often hold on to flagrantly faulty assumptions about their world for as long as a decade, despite overwhelming evidence that that world has changed and they probably should too [Ref. 21: 7].

Managers should continuously analyze the environment and change their agency accordingly. They should ensure communication is not inhibited, reinforce and reiterate the goals of the agency to the agency and the world, and they should control through the use of effective performance indicators. They should look for environmental changes and maintain an open mind when facing potential changes to their organization.

With a firm grasp of the successful manager's role and successful management principles, it is an opportune time to re-examine the causes of cost growth from a management perspective.

V. DISCUSSION OF CAUSES OF COST GROWTH

This chapter discusses the causes of cost growth from the perspective of those groups responsible to the public for the acquisition of major weapons systems. These groups are Congress, the DOD structure, program management and the contractors. A section for other major causes of cost growth considered in the literature review is included in this chapter. It should be noted that this chapter diverts from the conventional categories (economic, engineering, schedule, quantity, etc.) used by the SAR, CBO, Rand and other study groups to categorize causes in order to diagnose this problem from the viewpoint of responsibility and organizational design.

The single most significant cause of cost growth is discussed in the category "Other." This is the competitive and adversarial relationships of and between the aforementioned groups: Congress, DOD structure, program management and the contractors.

The plethora of quotes in this section is necessary to take advantage of the abundance of previous research performed on this subject.

A review of the table of contents for this chapter, especially the division of the subsections, is strongly recommended to provide the perspective and facilitate reading this chapter.

A. CONGRESS

This section examines the cause of cost growth as contributed to by Congress.

1. Inadequate Funding and Program Instability

Inadequate and inconsistent funding necessitates program changes by program managers and contractors. These changes affect the effort and speed of research and development, the schedule for production, and the production rates.

The most frequent root cause for schedule slippage mentioned in the SAR's (and in Congressional hearings) is inadequate annual funding. This reason was given in more than 31 SAR programs we [Rand] examined. An even larger proportion (one-half) of the programs at least three years past DSARC II blamed schedule slippage on inadequate funding. Frequently, funding cuts are made by the Congress because, in its view, there has been a failure to justify the program adequately. The Congress has been reluctant to fund programs until all of the outstanding issues are studied and resolved [Ref. 14: 92].

To accommodate this program budget reduction, schedule changes are usually required so as to reduce near term spending; the result is schedule stretch-out with some activities (and production) postponed to later years [Ref. 14: 71]

During the production phase, this schedule stretch-out prevents buying in economic order quantities and therefore contributes to cost growth.

Program instability is further exacerbated by Congress, with the help of GAO and staff, reviewing each weapon system and using their position to act as a third party manager.

In the early 1970's, a private group of 200 leading businessmen and educators issued national policy statements on Congressional budgeting and federal programs. Some of their observations are paraphrased below:

- Congress cannot oversee the entire federal budget each year on an item-by-item basis.
- Congress is involved in program details to the point of interfering with responsibilities [Ref. 24: 32-33].

This program instability contributes to cost growth by diverting managers' efforts toward satisfying the whims of Congress.

2. Contractor Favoritism in Congress

The political environment of Congress affects a program's management through social economic restraints and pork barreling. Of the two, pork barreling probably has the worse effect on program management. Pork barreling, or the scramble for defense projects by Congressmen for constituents back home, often seems to be the overriding concern of members of Congress. Within Congress the review channels of the Authorization, Appropriation, and Congressional Hearing committees provide ample opportunity for Congressmen to incorporate their needs and inputs. Republican Congressman William Whitehurst of Virginia defends two new nuclear aircraft carriers being built in his Norfolk, Virginia, district. Democratic Senator Sam Nunn of Georgia defends Lockheed's controversial C-5 transport planes produced in Georgia.

Senator William Cohen of Maine, Chairman of the Seapower Subcommittee, took advantage of approved funding for three AEGIS-system cruisers and had part of their production assigned to his state [Ref. 25: 27].

Even those doves who argue most for defense cuts have their pet interests: House Speaker Tip O'Neill and Senator Edward Kennedy support the F-18 because its engine is built in Massachusetts; Senator Alan Cranston supports the B-1 because its prime contractor is based in California; Senator Carl Levin supports the M-1 tank, built in Michigan; Senator William Proxmire, who likes to hand out the Golden-Fleece Awards to others, added 100 million to the defense budget last year by winning approval for a new mine sweeper to be built--where else?--in Wisconsin [Ref. 25: 27].

Except for the mine sweeper, all the aforementioned programs are controversial in either cost growth, performance, or both.

Congress, in its effort to gain votes from constituents, has enacted social economics restraints with which DOD must comply. Examples of this legislation include the Small Business Administration, requirement to procure prison-made products, the convict labor act and others.

The underlying insinuation that all contractors favored by Congressional backing contribute to the cost growth problem, of course, is not 100% true. The researcher did not discover any data on the performance of contractors with a strong backing in Congress. Nevertheless, it is apparent that the incentive the contractor requires to achieve cost goals is diminished with strong Congressional backing.

It should also be noted that this preferential treatment of certain contractors disrupts any previous program planning that managers have attempted, thus adding to cost growth.

3. Conclusions

Congressional policies and efforts to manage DOD violate four management principles: (1) span of control, (2) clear goal setting, (3) unity of command, and (3) complete delegation.

Span of control is violated by the Congress attempting to evaluate the annual budget on an item-by-item basis.

Congressional intervention reveals two ways in which the clear goal setting principles are not adhered to. The first is through the Congress providing funds but not participating in the responsibility of setting goals for the national defense level. The second infringement on clear goal setting arises from Congress providing inadequate or deficient funds. This requires all management levels from DOD to the program manager to reassess the necessary tasks to achieve previous design goals.

Changes in the funding plans also indicate nonobservance of the complete delegation principle as the Congress (through funding changes) hoards responsibility and authority from program management. In addition, contractor favoritism by Congress undermines authority and responsibility of the program manager.

Congressional favoritism to contractors and funding deficiencies evidence violation to the unity of command principle as Congress skips levels of DOD management in its effort to directly control programs.

B. DOD ACQUISITION STRUCTURE

1. Lack of Clear Goals

Clear goals are necessary to direct a program and its supporting subordinations in a unified, homogeneous course or direction. When goals are not clear, funds, time, and effort will be spent on purposes unrelated to a goal, causing cost growth. Goals, in terms of design requirements of a weapon system, should defend against threats as perceived by the JCS. Unfortunately, the program managers must concern themselves with securing funds from Congress and within DOD to support their programs. Congress and individuals of DOD have other goals the program manager must incorporate into his program before he is able to secure funding. This creates a dichotomy of goals between designing to meet a threat and developing a program to secure funding. This provides a situation for the program manager to decide goals instead of striving for them. In this case, he decides on the goals that enhance his own career and exercises the securing of funds.

The lack of clear goals originates at the top of the DOD structure. A former Chairman of the Joint Chiefs

of Staff, General David Jones, stated in the defense guidance report produced by the Pentagon: "It does little to set meaningful priorities" when discussing the rationale for buying weapons [Ref. 25: 27].

In the late 1960's a private group of 200 leading businessmen and educators issued a statement on national policy, stating:

Basic purposes, as well as choices between alternative means to achieve these purposes, tends to get lost in a staggering mass of budget documentation.

Emphasis has been placed on numbers of people, contracts to be let, grants or subsidies to be given and things to be purchased instead of on serving purposes or gaining results.

To have meaning and validity, the group said, budgets must be reviewed in terms of basic purposes [Ref. 26: 12].

A conservative defense analyst, Edward Luttwak, has written: "In lieu of strategy at all levels we have only budgeting, programming and politics." It is common knowledge that clarity of goals is one of the fundamental management principles of an efficient and effective organization.

2. Poor Implementation of Directives

The following is an excerpt from a NAVMAT-sponsored cost study:

We believe the most common reason for failing to implement recommendations is that management does not take vigorous action to insure implementation of the best recommendations. It is common practice for one level of management to direct a lower level of management a set of suggestions and then walk away. (There seldom is any follow-up.)

Other reasons for disappointing progress in implementing recommendations follow:

- Most implementation activity has been directed toward trying to show that recommendations have been implemented or closed out instead of monitoring to see if the purpose of the recommendations has been achieved.
- Many recommendations suggested specific changes and actions when a coordinated set of actions aimed at broad restructuring is necessary to resolve underlying problems.
- Many recommendations have been aimed at symptoms instead of basic causes and have suggested actions that could not correct the problem.
- Many recommendations do not come to grips with the fundamental incentives to motivate people to do what they do. (There are cases of past recommendations being implemented halfheartedly, or not at all, because they are really reverse incentives.) Others are implemented because they are directed at the wrong level of management (where implementation is beyond the scope of authority) [Ref. 27: 10].

Further evidence of poor implementation of directives is revealed in a GAO study of 28 selected weapons systems which found five instances of inconsistencies with the Office of Management and Budget Circular A-109 [Ref. 28: 9].

When a directive for controlling costs is not implemented, naturally cost growth will proliferate.

3. Promoting Spendthrifts

Within the DOD structure, there exists a natural proliferation of spenders in the higher ranks who have attained their positions by emulating their big-spending superiors. One analyst has stated: "No one ever gets

promoted for killing a project" [Ref. 25: 26]. "In addition, stars and bars are awarded for pushing a major project to completion, whatever the price" [Ref. 25: 26]. And in another paper, Dr. W. B. LeBerge stated:

The figure of merit by which senior officials are scored is how well they can convince their military and civilian superiors that their own program should be funded instead of someone else's.... All the incentives are on selling [Ref. 29: 59].

It is generally conceded to be exceedingly risky for a military officer or a civilian contractor to be open, honest, and conservative. It is far less risky to make grand promises and conceal what is really going on [Ref. 29: 56].

4. Too Many Reviewers

As described in Chapter II, a major weapon system must be reviewed at many levels. In the Navy, for example, the review of a major weapon system begins at the source selection committees and continues through the SYSCOM, NAVMAT, OPNAV, SECNAV, OSD, and finally, cost improvement groups (CAIG and ISMO). The consequences of Congressional review have been previously discussed. The other services have similar review structures. This review structure allows ample opportunity for reduction of goals, also previously discussed in relation to cost growth causes.

5. Service Competition for Funds

Competition among services for funds is most visible at the JCS level. This is thoroughly explained by Ronald Fox:

The Secretary of Defense himself works under considerable pressure from the military. Although the ultimate decisions affecting the acquisition of weapon systems are his responsibility, he does his work as a member of a team which includes the Joint Chiefs of Staff and the Secretaries of the military services. Decisions become particularly difficult for him when he must choose among systems promoted by competing services or when a system described as essential by a military Chief of Staff is not deemed cost effective by the Systems Analysis Groups [Ref. 30: 100].

With the services competing for funds, not only is the incentive on performance lost but the objective and effort toward monitoring the spending of funds is forgotten, which, of course, causes cost growth [Ref. 29: 83]. (It is implied here that the contractor will take advantage of the program manager's naiveté. This is further explained in Section C of this chapter.)

6. Program Manager Positions

The position of program manager is the focus of each weapons acquisition program. Thus this position must demand special attention. Unfortunately, the last major attention it received was from four of the ten Packard Initiatives of 1969. These are:

5. Improve training of program managers by establishing military training courses and schools to prepare them for the job.

6. Strengthen the authority of program managers, especially by giving them a clear written charter.

7. Attract superior officers to program management, in part by providing them with superior promotion opportunities.

8. Reduce the turnover rate of program managers so that they have longer job tenure.

The Rand study [Ref. 14] presents data showing that the tenure of the program manager has increased and that the program manager charters are written but advancement in the other two areas is not discussed [Ref. 31 16-17]. Of the 32 famed Carlucci initiatives, not one addresses the program manager's position.

7. Conclusions

The DOD acquisition structure does not adhere to the first six management techniques:

1. Span of control,
2. Clear goal setting,
3. Unity of command,
4. Short chain of command,
5. Complete delegation,
6. Exception principle,
7. Maintenance of resources.

Breach of span of control is observed whenever one person (or even a committee) is responsible for anywhere from 50 to 500 programs. Consider ARB, CNO, DSARC, and CAIG as examples.

Noncompliance with the clear goal setting principle is fully discussed in Section B.1 of this chapter.

Disregard of the unity of command is witnessed when someone from a higher position of the program (perhaps from

contractor influence) attempts to influence the program through advocacy or direct intervention.

Nonobservance of the short chain of command is easily evidenced by the many review levels within each service, then through DOD, and finally Congress.

Noncompliance with the complete delegation principle is witnessed by authority and responsibility for a program not located at one or two levels but at a minimum of five levels for any single program. Poor implementation of directives is indicative of indifference to authority, one facet of complete delegation.

Violation of the exception principle is caused by the many higher levels which have review responsibility of all decisions, not merely the decisions which are beyond the ability of the program manager.

Disregard for maintenance of resources (personnel in this case) is observed from personnel not implementing directives and by the promotion of spendthrifts.

C. PROGRAM MANAGEMENT

This section focuses on the DOD program office/program manager contributors to cost growth.

1. Underestimating Costs

Program managers underestimate costs for several reasons. One is that all weapons systems compete for funds at many levels within DOD and Congress. Thus "there is an

obvious incentive for the proponents of a system to underestimate its costs in order to increase its probability of acceptance" [Ref. 32: 9]. Another reason is the program manager's submission of tight budgets in order to force control of costs.

As dollars are the most widely used control mechanism, a practice of minimizing estimates of future costs has evolved as a management technique for attempting to impress contractors with the continuing need to produce more for less in a shorter period of time [Ref. 33: 55].

A third reason is that some managers are just overoptimistic. "Many studies advance detailed and repeated recommendations concerning budget overoptimism and program turbulence" [Ref. 27: 12].

The military especially endorses this thought for the obvious reason:

Our military bias is to get as much as we can get.... We are the ones who have to fight the wars, not the people in the Congress or the average taxpayers" [Ref. 30: 188].

2. Underestimating ILS

In terms of cost growth, the underestimating of logistics elements usually is not recognized until late in the life cycle. For instance, underestimating manpower, reliability, and maintainability requirements ultimately has the effect of increasing the manning requirements throughout the deployment phase many fold. Further evidence of underestimation of ILS is revealed in a recent

GAO report which examined 24 major defense systems.

We identified instances where the planned logistics (that is, parts, test equipment, personnel training, facilities, tools, technical data, and so forth) did not meet system availability and wartime usage requirements [Ref. 34: 4].

3. Naive Monitoring

A recent NAVMAT study conducted by Joseph Grosson on cost growth stated:

Most industry interviewees volunteered the perception that Navy acquisition personnel were intelligent, hard-working, and dedicated. They all stressed disappointment at the naivet  of these same personnel in the business management arena.... We have project managers who are superb naval officers but who have little practical experience in dealing with industry [Ref. 27: 12].

Another article recognized that "program management has been criticized for its lack of adequate control of contractors" [Ref. 31: 105]. Contractors are more than willing to take advantage of the naive government program manager, creating a situation leading to cost growth. (This point is further described in Section D.1 of this chapter.)

4. Inadequate Use of Resources

DOD has untold resources of material and manned laboratories. In addition, DOD programs have begun at square one (R&D) without DOD taking advantage of the established science of industry. Materially, DIPEC owns 20% of the productive equipment of the United States. The researcher did not ascertain the amount of this production equipment in use presently. By not determining resources available

within the government for use in individual programs, the program manager must satisfy all his needs through the contractor, thus contributing to cost growth.

5. Gold Plating

The desire for a program manager to continually incorporate the latest technology into his weapon system is referred to as gold plating. Systems should be designed to accommodate degradation in production but this should be the designer's (usually the contractor's) responsibility to incorporate into his prototypes or pilot production models. One explanation for gold plating is that

...during a design development, engineers generally are highly optimistic and have a can-do attitude for the practically impossible. Their reputation is at stake, and by reputation American engineering is always at the leading edge of the state-of-the-art. Thus, there is a tendency to overdesign a system and expect any problems to be easily overcome during development. "If we tweak this gadget here, or if we use this special blend of materials, this system will then be a real hummer" [Ref. 35: 106].

The expense of this gold plating is the element of cost adding to cost growth.

6. Conclusions

Management principles not adhered to by program management include:

1. the clear goal setting principle,
2. the unity of command principle,
3. the complete delegation principle,
4. the exception principle,

5. the maintenance of resources principle.

Clear goal setting, as discussed previously, applies here in program management also.

Noncompliance with the unity of command principle is evidenced by the requirement for program management to satisfy the requirements of many reviewers and funding sources.

Nonperformance of the complete delegation principle is evidenced by program management, being aware of its lack of authority and responsibility, purposely underestimating ILS and costs in order to gain commitment from Congress and superiors.

Nonobservance of the exception principle is evidenced by the program manager being so busy seeking funds that he does not have time to manage important decisions which arise involving the efficient use of those funds.

Disregard for maintenance of resources (personnel) is witnessed by acknowledgment that the naive program managers are not adequately trained for their positions and there is little planning for their tenure in office.

D. CONTRACTORS

1. Buying-in/Underestimating

The term buying-in refers to the contractor purposely underestimating the cost of a weapon system to secure award of the contract from the government and planning later to either swallow or compensate for lost costs.

Each contractor knows that, if he can win the first competitive bid, he will be facilitated by the government or assured of a contract that will allow him to write-off facilitation, that he will have a labor base to absorb his fixed overhead, that he will be able to absorb company-sponsored future development work, and that he can eventually make a profit. He knows if he loses he will be unable to do any of these things [Ref. 29: 57].

Industry interviewees candidly admit to buying-in and they explain in very rational terms why that is done. Most told us that the buy-in was a conscious decision driven by the need to underbid the competition and fit their perception of the Navy's budget profile. They intend at the offset to swallow most of the underbid, hoping to implement in-house efficiencies, etc., to remain in contract limits after award. Things go reasonably well for about one year after the award, during the initial paper and start-up stages. When the larger hard-core effort is undertaken, the bow wave eventually falls back as they contractors and their projections of cost growth exceed levels they were willing to absorb previously. Then we are hit with the surprise cost growth [Ref. 27: 12].

2. Unnecessary Engineering Change Proposal (ECP) Generation

This is a very difficult cost growth cause on which to find research data. However, the researcher has had several discussions with other acquisition specialists who recognize that the contractor ultimately reports to the stock market. In effect, this drives his need to develop profits any way possible and the most accessible vehicle for this is to develop unnecessary ECP's.

3. Conclusions

Research of the need for the military-industrial base is beyond the scope of this thesis. These cost growth

causes were presented to supplement previous discussion and to support training recommendations of the last chapter.

F. OTHER CAUSES DISCUSSED IN THE LITERATURE.

1. Competitive Relationships of the Above Groups

The competitive, sometimes adversarial, relationships among the above hierarchy of groups contribute to the cost growth problem by situating each of the groups in a position of defense or offense, whichever the case may be, as opposed to focusing attention on the actual development of the program. This predicament is exacerbated by the contractor who uses this environment which is conducive to swaying one part or the other. Consider the situation wherein a program manager evaluates a design requirement that the contractor is unable to achieve. Yet because the contractor's friend at a higher level, say OSD, sits on the review board, criticism of the performance goes unnoticed. This is acceptable to the program manager since his main goal is securing funds.

The Institute for Defense Analysis expanded upon this hypothesis, citing the

Competitive environment
within branch of service
within service
among services
DOD vs. other federal agencies
Executive Branch vs. Congress
among contractors
among individuals,

and adding

...we believe that the competitive environment in which weapon systems are developed is the major factor leading to cost growth. All weapons systems must compete for funds at many levels within the federal government [Ref. 1: 9].

2. Inflation and Technological Advancement

These cost growth causes are often discussed in the literature and media. For that reason only, are they listed here. The researcher attributes no real program cost growth to these causes. By definition, the increase/decrease in inflation should accompany a corresponding increase/decrease in revenues. Also by definition, technology should facilitate the design as well as create temporary impasses as it has done in the past and will continue to do in the future.

F. CONCLUSIONS

As it stands now, the program manager has little accountability. Should a problem, major or minor, occur in his program, he has many scapegoats for the situation. They are indicative of the faulty organizational design; the program manager can blame Congress or higher DOD level interference as the cause of his problem. The fact that his reasons for problems are accepted is indicative of acknowledgment by all members of the organization that the organizational design is faulty.

It has been vividly shown that the relationships of and within Congress, the DOD acquisition structure, and program management violate all the necessary static principles of

organizational design for efficient and effective acquisition of major weapons systems.

With this gross violation of management principles, each group has ample validity in placing blame for its problems on any of the other groups. (This placing of blame is substantiated and thoroughly discussed in an article by the Systems Acquisition Assessment which reviewed the major studies of the last ten years [Ref. 36: 12].) Designated program management has been shown not to actually control the major weapon system acquisition process, an unfortunate violation of management principles which contributes to cost growth. It is the intent of this thesis, after a discussion of a recent science, organizational development, which can help solve the cost growth problem, to make recommendations which will restore accountability to each group.

VI. ORGANIZATIONAL DEVELOPMENT

A. DESCRIPTION OF ORGANIZATIONAL DEVELOPMENT

A look at the controversial subject of Japanese management versus American management will help introduce this topic. The media's attention has focused on effective and efficient Japanese management as compared to poorer American management. This perception of American management is extremely skewed. In actuality, many American corporations have been amazingly successful due to their management techniques. Consider, as examples, IBM, Fairchild, IT&T, General Electric, General Dynamics, Johnson and Johnson, and 3M, just to mention a few [Ref. 21]. These companies achieved their success through effective management techniques similar to the holistic approaches OD embraces.

The following quote enhances this thought:

The findings from the excellent companies amount to an upbeat message. There is good news from America. Good management practice today is not only resident in Japan. But, more important, the good news comes from treating people decently and asking them to shine, and from producing things that work. Scale efficiencies give way to small units with turned-on people. Precisely planned R&D efforts aimed at big bang products are replaced by armies of dedicated champions.... Hierarchy and three-piece suits give way to first names, shirtsleeves, hoopla, and project based flexibility. Working according to fat rule books is replaced by everyone's contributing.

Even management's job becomes more fun. Instead of brain games in the sterile ivory tower, it's shaping values and reinforcing through coaching and evangelism in the field--with the worker and in support of the cherished product [Ref. 21: XXV].

1. Definition of OD

There are five important elements in the definition of organizational development which will be elaborated upon further. OD is: (1) managed from the top; (2) uses system-wide change; (3) considers planned changes only; (4) is long-term, and (5) uses behavior science methodologies.

Managed from the top, OD gives the top manager control. Changes to the organization are not accomplished without his compliance. He designs the goals and objectives for his organization.

A system-wide change, OD considers all the components of the system/organization to ensure fit and congruence, from goals to people's needs and expectations, and the culture they live in. This includes the needs of other sub-organizations.

Incorporating planned changes only, OD realizes the organization must react to its environment (i.e., culture to public laws). Changes to the organization to accommodate the environment are planned to prevent the environments from controlling the organization.

Long term in range, OD changes are designed for long-term effects. This requires recognizing that the environments are constantly changing and, as such, the organization must be capable of incorporating/assimilating these changes.

OD uses behavior science methodologies. An organization's most important resource is its people.

Incorporating behavior science techniques based upon studies and evaluation of people within organizations, it is possible to make effective use of people and encourage their optimal productivity.

2. Understanding the Organization

This section presents two concepts essential for understanding any organization. The purpose of this section is to emphasize the relationship of the organization to the world around it and to the organization's internal components. The success of balancing these relationships directly affects the efficiency and effectiveness of the organization. The concept referring to the ability of an organization to adapt is organizational health [Ref. 22: 6].

a. Congruence and the Organization

The model shown in Figure 16 presents the organization, represented by the dashed line, and its dependency on people and the environment. Beer explains the four components of this model. .

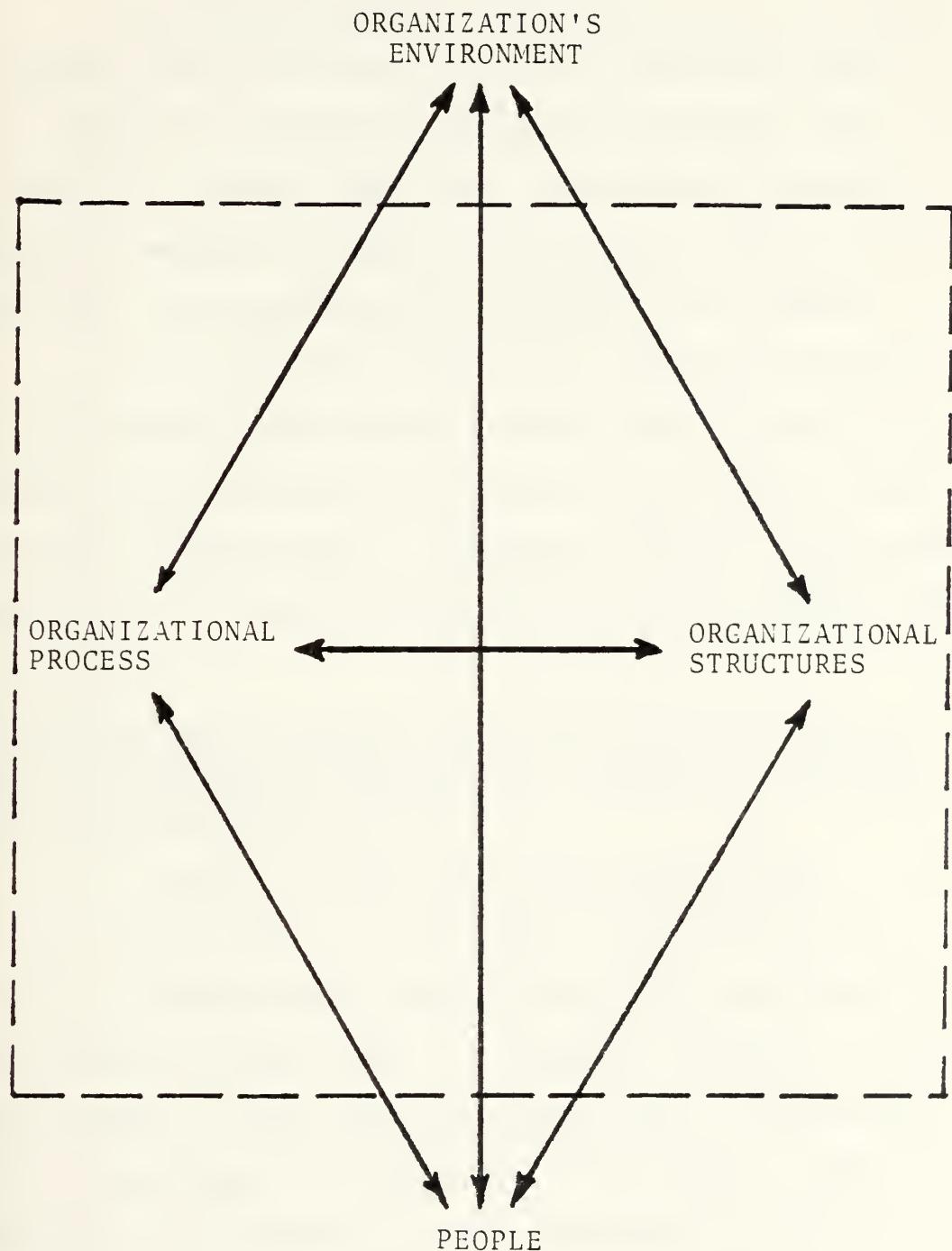
(1) People: Abilities, needs, values, and expectations of employees.

(2) Process: The behaviors, attitudes, and interactions that occur within the organization at the individual, group, and intergroup level.

(3) Structures: The formal mechanisms and systems of the organization that are designed to channel behavior toward organizational goals and fulfill member needs. Examples of these include job description, job evaluation systems, organization structure, policies, selection systems, control systems, and reward systems.

Figure 16.

Four Organizational Components Which Must Be Congruent.



(4) Environment: The external conditions with which the organization must deal including its market, customers, technology, stockholders, government regulations, and the social culture and values in which it operates. [Ref. 22: 5-6].

In this perspective the organization is viewed as a dynamic entity that must vary its "structures and processes required by changing conditions and people" [Ref. 22: 4]. Thus it is evident that the structures and processes developed by managers to operate in one environment are probably not sufficient for use in another environment.

As indicated by Figure 16, though the people and organization's environment are not within control of management, the organizational process and structures are controllable by management. Ultimately then it is management's responsibility to maintain congruence between the components of the model.

An organization's capacity to achieve its goals and fulfill member needs is a function of the extent to which there is congruence between people, process, structures, and environment [Ref. 22: 5].

b. A Social Systems Model of Organizations

The social systems model of organizations, Figure 17, is more complex and thorough than the four-concept organizational model. For some, a detailed study of each element of the social systems model is necessary to fully comprehend the usefulness of the model. This explanation can be found in Beer, Reference 21. The practical value of this model becomes evident during the

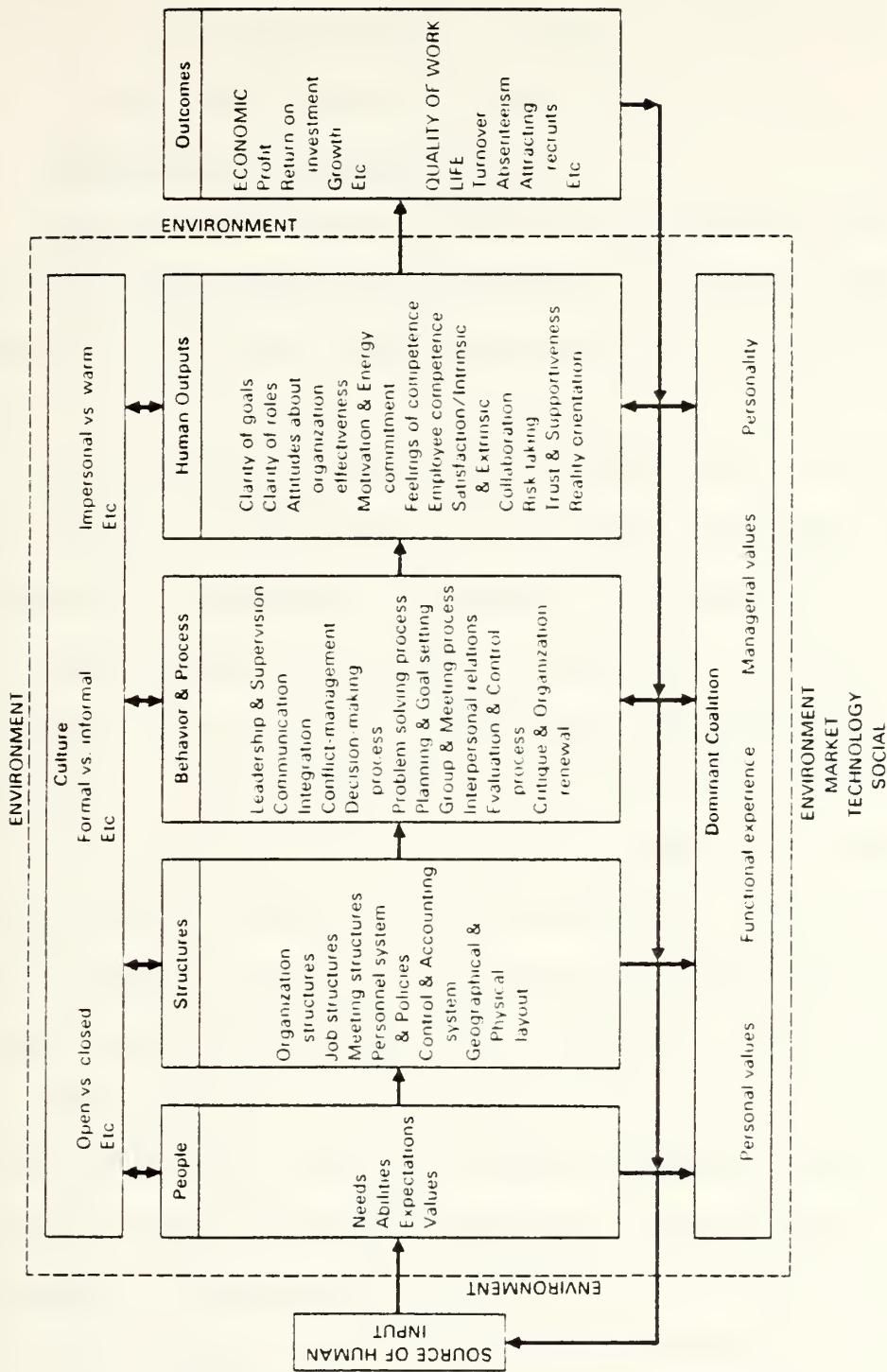


Figure 17. Social Systems Model of Organizations.

diagnosis of an organization. Its use is derived from knowledge that an organization's elements must be congruent in their relationship to each other.

3. Synopsis of OD Intervention

A macroscopic view of an OD intervention begins with gaining commitment from top management to design a more efficient and effective organization in order to achieve goals.

The next step, diagnosing the problems of the organization, requires a comparison of data from different sources, questionnaires, interviews, diagnostic meetings, etc. This data is compiled and presented to management. Management then presents the results to the people, explaining the incongruencies in the organization and its desire to correct them. It is necessary at all times to allow the people of the organization to know what the intentions are, through constant feedback, in order to gain involvement from them. This facilitates the design of the solutions and gains greater commitment to the change process. Finally, management and the workers together design follow-up methods which will include new performance indicators and meetings for the sole purpose of ensuring the organization is achieving its goals. The emphasis here is that the follow-up procedures are continuous, reassuring the organization's constant reassessment of its ability to achieve its goals.

It must be mentioned that every OD intervention will be different from all others. This fact indicates the uniqueness of OD as a solution by its recognition of the commensurate uniqueness of any individual organizational problem.

4. Models of Intervention

The literature's most renowned authors vary on the number of steps required in an OD intervention, from three to seven. This section describes several models. These models should be viewed as problem solving techniques versus actual OD interventions. (The primary emphasis of an intervention includes feedback to the client, management, and employees which is crucial to the success of the intervention.)

a. The Kolb-Frohman Model (Modified)

There are many intervention models as indicated by Figure 18. However, the researcher's favorite is the seven-phase Kolb-Frohman Model as modified by Warner Burke [Ref. 23: 158-165]. The seven phases follow:

(1) Entry. Initial contact between the consultant and the client organization begins the entry phase. This phase may include as many as two or three meetings where the consultant and the client assess whether they can relate to and trust each other. The consultant will be interested in the client's readiness for change, the resources available for change, the commitment of top management to an

FIGURE 18.
OD MODELS FOR INTERVENTION

<p>KOLB-FROHMAN MODEL</p> <ol style="list-style-type: none"> 1. Scouting 2. Entry 3. Diagnosis 4. Planning 5. Action 6. Evaluation 7. Termination 	<p>SCHEIN MODEL</p> <ol style="list-style-type: none"> 1. Initial contact 2. Defining relationships 3. Selecting a setting and method of work 4. Data gathering and diagnosis 5. Intervention 6. Reducing involvement 7. Termination
<p>LEWIN MODEL</p> <ol style="list-style-type: none"> 1. Unfreezing 2. Movement 3. Refreezing 	<p>LAWRENCE AND LORSCH MODEL</p> <ol style="list-style-type: none"> 1. Diagnosis 2. Planning action 3. Implement action 4. Evaluation
<p>LIPPIT, WATSON, AND WESTLEY MODEL</p> <ol style="list-style-type: none"> 1. Development of a need for change. 2. Establishment of a change relationship. 3. Working toward change. 4. Generalization and stabilization of change. 5. Achieving a terminal relationship. 	

OD intervention, and sources of support. Typical sources of support include the consultant's developed trust with top management, his expertise, dissatisfied constituent of the organization, and a possible co-worker.

(2) Contracting. This phase could be very brief if the entry phase has been smooth. The contract may be anything from a formal document to a verbal agreement. More often, the contract is considered to be the exchange of letters between the two parties. Contract data usually includes how much the consultant is going to be paid, handling of sensitive data, amount of responsibility for change by each party, the role of the consultant and, of course, specification of the client.

(3) Diagnosis. Though diagnosis may begin at the entry phase, this phase crystalizes it by gathering and analyzing data. Specific data-gathering techniques include observations, interviews, questionnaires and review of organizational documents. Analyzing the data requires developing conclusions from the assembled data.

(4) Feedback. The feedback phase improves chances of success when administered soon after the diagnostic phase, when it is presented by management (of course, the consultant first presents it to management), and at an off-site location. Presenting the results of the diagnosis at an off-site meeting enhances feelings of a new start. Normally these meetings are held with top management first, then middle

management, and finally with the employee group. At these meetings the diagnosis may be corrected by either the client system or the consultant.

(5) Planning Change. After two days and within a week, the meeting for planning change should occur. Participants may include any combination of the consultants, top management, and the employees. Greater commitment to the change is gained from the client system if the change is developed by the element of the client system from where the problems (as determined by the diagnosis) originate.

The purposes of the planning phase are (1) to generate alternative steps for responding collectively to the problems identified in the diagnosis and (2) to decide on the step or order of steps to take [Ref. 23: 163].

(6) Intervention. Implementation of the planned change occurs during this phase.

Some examples of interventions at the individual level are job redesign and enrichment, training and management development, changes in the quality of work life, management by objectives, and career development. At the group level, interventions may include team building, process consultation, or the installation of autonomous work groups or quality control circles. Resolving intergroup conflict might be an intervention, as might changing such structural dimensions of the organization as reporting relationships, moving toward or away from decentralization of authority, modifying physical settings, or creating informal structures in the organization [Ref. 23: 163].

(7) Evaluation. As it is difficult for the consultant to be totally objective, it is wise for "someone other than the consultant to conduct an evaluation of any OD effort" [Ref. 23: 163]. The depth of evaluation may "range

from the clients' saying that they are pleased with the outcome to a systematic research effort employing controls and multiple data analyses" [Ref. 23: 164]. The evaluation is significant to the client system as it reinforces the change effort and to the consultant as it is constructive in evaluating his effectiveness.

(8) Termination. The successful and ideal OD agent is expected to work himself out of a job, to leave the client with a follow-up methodology in which the client monitors itself. However, Burke does not include termination in his phases for several reasons and the researcher agrees.

A primary role of the OD agents is to serve as guardians of the new culture. They help to regulate the social change that has become a new routine in organizational life [Hornstein et al., 1971]. This regulation may take a variety of forms ranging from periodic checks with the client managers regarding the continuing effectiveness of changes to more systematic follow-up activities, such as conducting annual surveys, attending a manager's staff meetings as a process consultant, or helping to design and conduct off-site planning or diagnostic meetings for departments or divisions [Ref. 23: 163].

Also,

...the process is cyclical (W. L. French, 1969), and since an organization both is dynamic and naturally follows the entropic process, there is always a great deal of consultive work to be done [Ref. 23: 165].

Finally it should be pointed out that these are phases which blend and overlap to a great extent. "Phases is an appropriate term also because of the cyclical nature of the OD process" [Ref. 23: 166].

b. The Kirk-Lewin Model

The Lewin Model is a simple three-step one, but it is an effective perspective of change. The first step in the change process is unfreezing. The unfreezing may occur from a survey/questionnaire which shows serious problems in the managerial process of the organization, thus establishing a need for change.

The second step, movement, could be organization restructuring, team development, elimination or implementation of problem-solving techniques or an array of other interventions focusing on improving the process operation of the organization.

The third step, refreezing, may include a new reward system that will positively reinforce the desired behavior change, a new approach to managing people, or new norms such as collaboration rather than competition. These are deliberate steps to ensure that the new state of behavior remains relatively permanent.

Each of the steps may require some kind of confrontation or a process of reeducation.

c. Other Models

Other popular models are presented in Figure 18.

B. ATTITUDES AND CHANGE

1. Influence of Environment on Employees' Attitudes

The employee's attitude is dependent on the environment in which he is placed by management. Despite the emphasis of the organization, market or non-market, the attitudes of people are affected, changed, and manipulated similarly. The employee is no different from the reader or the researcher. Placed in a certain environment, he will react accordingly. While considering the following arguments, consider also the bickering environment of the present acquisition process.

In experiment after experiment, Edward Deci of the University of Rochester has shown...that people must believe that a task is inherently worthwhile if they really are to be committed to it. (In addition, he found if we too regularly reward a task, we often vitiate commitment to it.) [Ref. 21: 72]

As a sample case,

...Zimbardo advertised in a newspaper in Palo Alto, California (a prototypical upper-class community), soliciting volunteers for a "prison" experiment. At dawn one Saturday morning he went out, picked the volunteers up, booked them and took them to a wall-board "prison" in the basement of the Stanford University psychology building. Within hours after their arrival, the randomly assigned "guards" started acting like guards and the randomly assigned prisoners started acting like prisoners. Well within the first twenty-four hours, the guards were behaving brutally--both physically and psychologically. By the end of the second day, a couple of the prisoners were on the verge of psychotic breakdown and had to be released from the experiment. "Warden" Zimbardo, afraid of his own behavior as well as that of others, stopped the experiment four days into a ten-day protocol [Ref. 21: 79].

Analogously what is called "foot-in-the-door research" demonstrates the importance of incrementally acting our way into major commitment. For instance, in one experiment in Palo Alto, California, most subjects who initially agreed to put a tiny sign in their front window supporting a cause (traffic safety) subsequently agreed to display a billboard in their front yard, which required letting outsiders dig sizable holes in the lawn. On the other hand, those not asked to take the first small step turned down the larger one in ninety-five cases out of a hundred.

The implications are clear: once one can get people acting, even in small ways, as he wants them to, then he can convince them to believe in what they are doing. "Doing things...leads to...adaptations...and commitment; it is the hallmark of a well run" organization [Ref. 21: 74].

The two cases cited reveal the importance of the environment or controlling the environment on the attitude of the employee.

Thus it can be argued that the employee's actions are dependent on the employee's attitudes which are a function of how he perceives himself in the organization.

2. Attitudes toward Change

More often than not, one would see a section on resistance to change versus attitudes toward change, the former argument belonging, of course, to the pessimist.

People resist change--or do they? Does an employee resist an upward change in pay rate or vacation allowance? Does a homemaker resist replacement of a cranky old dishwasher for a new one? Does a manager resist an imposed schedule change that requires him to represent his division at an important reception for the new company president rather than finishing his quarterly budget? All these changes are likely to be welcomed warmly and to be implemented with great cooperation from the people concerned. What distinguishes these changes from the changes that people resist strongly is the fact that their nature and effects are relatively well known and are enthusiastically desired. The degree of people's resistance to change depends on the kind of change involved and how well it is understood. What people resist is not change but loss, or the possibility of loss (Marris, 1972). [Ref. 23: 51-52]

3. Conclusion

A change can be successful if the environment is controlled, if the change is seen as an improvement, and if there is inherent worth in the change.

C. PROFIT VS. NON-PROFIT ORGANIZATIONS

To verify that OD can be used in both a profit and non-profit organization, Appendix B presents a sample case of each situation.

D. CONCLUSIONS

OD successfully employs the management techniques of Chapter IV to create/reform an organization which is capable of maintaining its own most efficient and effective configuration.

VII. RECOMMENDATIONS

A. THE AARON RECOMMENDATION

1. Use OD to Promote Management Principles

It is recommended that an office be established at the DOD level which will use organization development to promote management principles. Each service's OD group should be ascended to an organizational status in which implementation can begin. Naturally, it is prudent to initiate OD on a small-scale basis with the intent of expanding it through the entire service.

a. Considerations in the Implementation of OD

To ensure successful OD interventions, it is necessary to select consultants who have a record of successful interventions.

If an agency or agency head is not ready or willing for an OD intervention, the effort to intervene will fail. Commitment is particularly required from top management.

The employees also must recognize a need for change and be ready for an OD intervention. An OD intervention which fails to gain commitment from employees and top management is doomed to failure. A successful OD consultant is able to recognize commitment and will decide to proceed or arrest the intervention.

b. Considerations Concerning Management Principles

(1) Maintenance of Resources

Tenure and training of program managers are extremely important here. Tenures must be matched to program lengths in order to personnel to feel full commitment to the assigned program. Rotating personnel as the system is designed now should only be used for intern training programs. Training future program managers is necessary to maximize efficient use of personnel. Certainly it is prudent to spend \$30,000 to \$80,000 to develop an efficient and effective program manager to manage a \$1 million to \$6 billion program.

The training program should stress:

- (1) management ethics, (2) program management and acquisition,
- (3) organizational development, (4) contracting and solicitation,
- (5) managerial accounting/financial management,
- (6) current technology of the particular program, and
- (7) systems analysis.

This program should be at least one year in length with a repertoire of twelve to sixteen instructors. This one year of academia will provide a manager (at any level) with the realistic overview required for efficient and effective management.

Another aspect of this training is a reeducation process, proposed for two reasons: (1) to verify that

the managers have effectively enacted the complete delegation and management by exception principles which are proven when the manager leaves the organization and it still operates effectively and efficiently without him, and (2) to remove the manager from his position for reeducation in order to reacquire the objective viewpoint that he brought to the organization. This retraining should bring him up to date on new developments in the training areas above and should perhaps coincide with his vacation plans to ensure a long separation from his office.

(2) Goal Setting

Time commitment to cost control by DOD could be promulgated through a highly publicized personnel reward program. This program would indicate to the contractor as well as to the program personnel DOD's dedication to cost control.

Assuming that sometime in the future DOD is able to show significant achievement in cost control to both Congress and the public, it may be possible to create realistic goal setting between Congress and DOD. This goal setting would require both Congress and DOD to decide upon a perceived threat supported by specific programs to which a fixed percentage of the federal budget is permanently legislated. This approach is similar to the program full funding approach discussed by Ravetti in 1977 [Ref. 37] and alluded to by Ronald Fox [Ref. 30].

B. FOR FURTHER INFORMATION

It is not the purpose of this thesis to elaborate on the other benefits of OD of which there are many. However, for further information and/or to start this process, it is recommended that readers contact any or all of the services' organization development groups and/or the researcher for further information:

Navy: Human Resources Management Plans and Policy
Branch (NMPC-6)
CPT Dana P. French
Washington D.C.
A-22
202-69

Army: Organizational Effectiveness Office
HQDA, DACS-DME, Pentagon
Colonel Robert J. Landers
Washington, D.C.
A-225-1825
202-695-1825

Air Force: Deputy Chief of Staff for Manpower and
Personnel
HQUSAF/MPXH
Major Roger A. Bossart or Major Lee Johnson
A-224-8270
202-694-8270

Researcher: Naval Electronics Systems Command
Robert D. Aaron, Code 81317
Washington, D.C. 20360
A-222-7323
202-692-7323

APPENDIX A

ACRONYMS

AFLC	Air Force Logistics Command
AFSARC	Air Force Systems Acquisition Review Council
AFSC	Air Force Systems Command
ARB	Acquisition Review Board
ARC	Acquisition Review Committee
ASARC	Army Systems Acquisition Review Council
ASD	Assistant Secretary of Defense
ASU	Approval for Service Use
CAIG	Cost Analysis Improvement Group
CBO	Command Budget Office
CDR	Critical Design Review
CEB	CNO Evaluation Board
CNO	Chief of Naval Operations
CS/CSU	Cost Schedule/Control Systems Criteria
CSA	Chief of Staff of the Army
DARCOM	Development and Readiness Command
DCP	Decision Coordinating Paper
DNSARC	Department of the Navy, Systems Acquisition Review Council
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DSARC	Defense Systems Acquisition Review Council
DSECDEF	Deputy Secretary of Defense
DT	Development Test
FIP	Functional Implementation Plan
FOT&E	Final Operational Test and Evaluation
GAO	Government Accounting Office
HLT	Hardware Lead Time
HQDA	Headquarters Department of the Army

HQMC	Headquarters Marine Corps
HQUSAF	Headquarters United States Air Force
HRMC	Human Resources Management Center
ICMO	Indirect Cost Monitoring Office
ILSP	Integrated Logistics Support
IMIP	Industrial Modernization Improvement Program
IQC	Initial Operational Date
IPS	Integrated Program Summary
LCC	Life Cycle Cost
MAJCOM	Major Command
NAVMAT	Naval Material Command
NSIA	National Security Industrial Association
OD	Organizational Development
ODCSOPS	Office of the Deputy Chief of Staff, Operations and Plans Acquisition
ODCSRDA	Office of the Deputy Chief of Staff, Research, Development and Acquisition
OMB	Office of Management and Budget
OPNAV	Office of the Chief of Naval Operations
OSD	Office of the Secretary of Defense
OT	Operational Test
PAT&E	Production Acceptance Test & Evaluation
PDR	Preliminary Design Review
POM	Program Objectives Memorandum
P ³ I	Preplanned Product Improvement
PRR	Production Readiness Review
RDT&E	Research Development Test & Evaluation
RMS	Research Management System
SA	Secretary of the Army
SAF	Secretary of the Air Force
SAIMS	Selected Acquisition Information Management System
SAIP	Ship Acquisition and Improvement Panel
SAR	Selected Acquisition Reports
SCP	System Concept Paper

SECDEF	Secretary of Defense
SECNAV	Secretary of the Navy
SOA	Separate Operating Agencies
SSG	Special Study Group
STF	Special Task Force
SYSCOM	Systems Command
TEMP	Test and Evaluation Master Plan

APPENDIX B

CASES

This appendix presents two cases which substantiate that OD is used in profice organizations as well as non-profit organizations. The source for these cases is: Rolf E. Rogers and Robert H. McIntire, Organization and Management Theory: Case Analysis Manual for Instructors, John Wiley & Sons, Inc., New York, 1983.

CASE 16

OMEGA AERO-SPACE CORPORATION

I. Background

The Omega Aero-Space Corporation is a multi-divisional organization with divisions through the Western and Southern States. Each division is autonomous within the total organization and is based on the product orientation of organization design.

Omega Aero-Space Corporation has four primary divisions: space, aircraft, weapons systems, and commercial products. In turn, each of these divisions has its own research, engineering, production, marketing, accounting, and personnel departments.

Corporate policy is administered by the "headquarters" division which functions as the policy making and control agency for the corporation. Each division operates as a separate profit center, accountable to the Corporate President and Board of Directors.

The case study deals with two departments within the Weapons Systems Division, Management Analysis, and Data Processing. Both departments are concerned with the analysis, design, and implementation of management systems. The objective of a management system is to direct a set of activities toward achieving improved control of operations, resulting in improved profitability. To satisfy these goals, the Management Systems Department has been making extensive use of computer based systems to provide a quick response in the manipulation of large amounts of data and to improve the effectiveness of the functional departments (clients).

The Management Analysis Department and the Data Processing Department have the responsibility to design and implement the most efficient management systems. Management Analysis reported to the Vice President of Administration, while Data Processing was under the direction of the Chief Financial Officer (Controller) for the division. In turn, both of these executives reported to the President of the division who reported to the Corporate President and the Board of Directors.

Through executive direction or by formal request, operations or management problems would be brought to the Management Analysis Department. The Director of Management Analysis would assign the project to the appropriate manager in his department for scheduling and team appointment. The study approach by the team consisted of the analysis of the problem, the evaluation of alternatives, and the proposal of the optimum solution. If the client accepted the solution, and the solution was for a computer based management system, it would be turned over to the Data Processing Department for computer design, programming, implementation, operation, and maintenance responsibility.

The profitability of the Weapons Systems Division was based on its ability to obtain military contracts for study, design and production of weapons systems. Contracts were awarded on the basis of competitive bids. Bid preparation was a complex process performed by a separate organization in the division known as the Estimating Staff, which reported directly to the Division President. Bids were based on data collected from the various departments.

II. Symptoms

The first apparent symptom is the fact that the Weapons Systems Division was losing an unacceptable number of bids, resulting in a loss of profit for the division. The Estimating Staff could not get bids out in time nor could they effectively establish accurate estimating costs in the time allotted.

The second symptom was that the Data Processing Department was unable to implement the proposals for the new estimating system as proposed by the Management Analysis staff. No word had been heard from Data Processing until the monthly staff meeting held by the President, when he inquired as to the whereabouts of the progress report for the implementation of the new computer based system.

The third symptom is that the Controller, who had been instructed to have the Director of Data Processing prepare a monthly progress report to both himself and the Division President, did not take the initiative to check with the Director of Data Processing, when the report was not submitted, until asked to do so by the Division President. This symptom indicates that there is perhaps a lack of communication between the Controller and the Director of Data Processing. As becomes apparent later in the case, the Director tried to get more information on the new system from the Management Analysis Department who designed it, but had little success. Furthermore, the Controller, who was responsible for the Data Processing Department, failed to determine why he had received no progress report. This symptom also suggests that there is a lack of communication within the department itself.

A fourth symptom is that meetings had to be scheduled between the Management Analysis Department and Data Processing to work out solutions to the problems that were keeping the new management system from being implemented. The fact that meetings had to be arranged between the two departments is an indication that there was little if any communication between these departments.

A fifth symptom is that these scheduled meetings were finally cancelled resulting in a complete break in communication between the two departments. This action was taken by the Controller and Director of Data Processing. A separate meeting with the Division President was held where both the Director and Controller outlined their perceptions of the present conflict to the President.

The final symptom in the case is that the two departments were apparently at such extreme opposites, that outside consultants had to be retained to resolve the problem. After having consulted the Director of Management Analysis, it became evident to the President that no amount of meetings held between the departments would now solve

the problems. It was no longer a problem of implementing a new management system, but rather a complete breakdown of the two organizations.

III. Causes

The division was in a profit decline because the present procedure of estimating was cumbersome and time consuming. In addition, the costs that were estimated for materials, labor, and overhead were not based on present costs. The aero-space industry is a dynamic and growing industry. New innovations are continually being developed, especially in the Weapons Systems field. Therefore, it was essential that valid and current estimating costs be available. If not automated, the process of estimating is quite time consuming and with the fluctuations in the cost variables, it is apparent that the costs will be inaccurate in relation to actual expenditures. As a result, the Weapons Systems Division was losing bids to competitors who had more realistic cost estimates.

The Data Processing Department could not implement the proposed management system because the design of the system was considered impractical by the staff in Data Processing. In developing the new system, the Management Analysis Team did not take all of the variables within the organization into consideration, such as, the technical problems associated with the design, programming, and operational implementation of the system, nor did they consider the present work load in Data Processing. The proposals given also did not take into consideration the aspect of familiarity with the new proposed computer language.

The lack of communication between the two departments could be attributed to the Controller, for when the Management Analysis staff was established, the Controller felt that it should be established as part of his department and sent letters to several executives suggesting this arrangement. However, Management Analysis was made a separate department. It could be argued that he deliberately caused the problem with the progress report (in terms of the President) to illustrate that Management Analysis should be placed under his control. The very fact that the Controller felt that he should have charge of Management Analysis, suggests that there would be problems in communication at the staff level between the two departments.

Because of personal implications and the fact that Data Processing was not consulted in the development and design of the proposed computer based management system, both departments were forced to have meetings to attempt to solve the problems in the design, programming and scheduling of the system. The cancellation of these meetings indicates that both departments were unable to reach any consensus in the solving of their problems. This can be attributed to the absence of formal communication between the two departments until the proposed system was to be implemented. Both departments, as noted previously, acted as autonomous organizations. There seemed to be no coordination. Also there were accusations of incompetency coming from Management Analysis resulting in negative reactions by the members of both organizations and finally a general disagreement as to who has authority over whom. All of these problems appear to have their basis in a "power struggle" between the Controller and the Director of Management Analysis.

IV. Alternative Solutions

The alternatives to solve the problems of internal strife between the Management Analysis Department and Data Processing Department are as follows:

1. Leave things as they are.
2. Leave the organization structure as it is but assign new directors.
3. Combine Management Analysis with Data Processing or vice versa.
4. Combine one department with the other and restaff the Controller and Director positions.
5. Redesign the organization structure so that Management Analysis and Data Processing are combined into a centralized organization under a new head, and restaff the managerial positions.

Leaving things as they are has a low probability of solving the problems. The key members in the organization could be asked to participate in a T-Group to make them more aware of the needs of the members in both organizations. But this is not a plausible solution. Both groups are questioning the rights of legitimacy and authority; therefore, the status quo is not a feasible solution. Sensitivity training or the redefinition of the organization structure would be of little value, presumably after a period of time there would once again be the struggle for power between the Controller and the Director of Management Analysis. This power struggle is an attempt to fulfill personal goals and not those of the organization.

Leaving the organizational structure as it is but appointing a new Controller and a new Director of Management Analysis would remove the problem of having personal goals interfere with those of the organization. The questions that still remain, however, are the issue of who has "control" over whom and also at what point if any should Data Processing be brought into the study of a management system: after the study is completed and accepted or during the study.

Combining one department with the other would address the question of control and authority but this would probably only increase the struggle for personal power between both key members; the Controller and the Director.

Combining one department with the other and restaffing the Controller and Director positions would alleviate the question as to who tells whom what to do. With new staff members, the organization may redefine its goals to correspond to those of the entire organization, but it will probably fail when assigned an analysis problem if each department is kept as a separate entity.

The last alternative solution is considered the optimum solution, therefore, it will be discussed in detail under the title ~~Optimum Solution~~.

V. Optimum Solution

The optimum solution is a combination of several of the alternatives discussed above. Both Management Analysis and Data Processing should be reorganized as a new department; but still making use of existing groups within both present departments. By combining both departments, the affect would be to centralize all of the activities involved in the analysis, design, development, and operation of a management system.

Centralization of a management system is based on the principle of functional specialization. Therefore, everyone concerned with the analysis and operation of a management system is placed within that system. Where an organization is separated into different functional divisions, it is difficult to achieve cooperation spontaneously, because each unit is established as a complete entity and works in terms of its own system rather than in terms of the organization as a whole. Each unit tends to "suboptimize" and finds ways to protect itself from the encroachment by others. The result is conflict which develops at all levels. Also, administrators may become so involved in resolving real or imagined incompatibilities between systems that they tend to negate the objectives of the total system. By combining the two departments as a new organization, that new organization would be able to react quickly and collectively in decisions involving the analysis of management systems. The new department should use a project management approach, that is, no rigid boundaries and analysis teams including all related activities within the scope of analysis. These teams would, in effect, work as integrated units. All individuals necessary to do a specific job would report to the head of each project team who would be able to interact with everyone directly associated with the achievement of the project's objective. A coordinator of projects is needed to coordinate the information, research knowledge, and operation of each team, thereby increasing the overall efficiency of the project approach.

The assignment of a new director from outside the division (from the corporate office) should eliminate most of the conflicts in personal interests which were present.

In summary, the optimum solution is to centralize the two present departments as a new department and appoint a new director for the new department. In addition, the other key positions in the new organization should be restaffed by members from within the organization whose personal goals are in harmony with those of the organization.

CASE 23

THE MANPOWER OFFICE

I. Background

A. Organization

The Manpower Office is a special branch of the Manpower Division of the Federal Government and is a typical government bureaucratic organization. See Addendum A.

Authority

Mr. Nelson draws his authority from the central office and reports to the head of the central office. Non-scheduled or surprise visits are made by the central office to check on the work and progress of Mr. Nelson.

Mr. Peron, after replacing Mr. Nelson, received his authority from the same source as does Mr. Nelson.

The employees in the branch office report directly to Mr. Nelson.

Duties and Responsibilities

Mr. Nelson -- manager of the Manpower office was appointed in the Spring of 1968. He had previous experience in the central office since 1950 as a counsellor and subsequently advanced to division head by 1967 at age 50. He also had experience in special committees to solve problems of major interest arising in any of the departments within the division. His former employment record indicated that he had been an assistant personnel manager for a large manufacturing firm.

Mr. Peron, assistant division head, started as a trainee after graduation from university. He has worked in almost every department to get an overall view of the operation of the division. He appears to be helpful to others and has developed new ideas for improvement in the organization. In 1967 he was also appointed to the special committee.

Employees

The staff of the special branch consists of young university students who work in this branch during the summer months. Their main job is to interview high school students for prospective jobs, canvass the neighborhood to find out how many jobs may be open to students, screen applicants and make referrals to employers. They maintain a file on each student and keep a report on the students' progress. During peak periods the work load is heavy.

Organization Goals

The objective of the branch office is find summer jobs for high school students.

Procedures

There are certain established procedures for the staff in the branch. During May and June, staff would canvass the city to contact prospective employers for high school students. Other staff would remain in the office to interview students who "walked in" looking for jobs. A system was set up for student referrals and also for calling employers who indicated that they would employ students.

B. Human Resources

Technology or Administrative Qualifications

Mr. Nelson's education is now known, but he has many years of experience in the Manpower division. There is no data on his performance as an assistant personnel manager with the manufacturing company.

The job of manager of the special branch calls for experience in this type of work. The person selected is usually a division head or an assistant division head. The job of branch manager is also a "stepping stone" to better jobs within the division.

Mr. Peron has a degree in psychology and appears to be well qualified on paper for the job of counsellor and later as division head.

Interaction

The case shows that interaction between Mr. Nelson and his subordinates was high during the first weeks of the operation and seemed to be quite amicable, however, the interaction was one-way from supervisor to subordinate. Subordinates were not allowed to question the supervisor's decisions or to bring forth new ideas for improvement. As work progressed and work load increased, interaction between supervisor and employees became hostile and aggressive.

Leadership

Mr. Nelson is an authoritarian type of leader. He states what he expects of the students and tells them that he is boss and they must follow his instructions to the letter. Rules must be strictly adhered to, such as coffee breaks, where only 15 minutes are allowed and personnel must finish what they are doing before going on breaks. Work must commence on the hour and finish on the hour. Procedures for work must be adhered to and there must be no deviation from the established pattern. He does not like students discussing problems with one another, but they must go directly to him. He interrupts staff members while they are dealing with the public and uses "name calling" when they make errors. He does not give his staff a chance to explain themselves when they make mistakes nor does he accept their position and has used dismissal in one instance. After reprimand by his superior, he withdraws to his private office.

Mr. Peron seems to be friendly, outgoing and dynamic. He asks employees for their opinions and works in a cooperative manner with them. He appears to alleviate anxiety and work continues without any apparent problems after his arrival in the branch office.

Attitudes

Mr. Nelson is very overt in showing his attitude toward university workers. He calls them long-haired hippies and tells them they should get their hair cut when some of them misunderstand orders. He wants to portray a good picture of an efficient government operation and pushes his staff to work harder by intimidating them. He blames them for his poor performance when he receives the reprimand.

Sentiments

Before Mr. Nelson took over the responsibility of the branch office, he indicated that he did not want to work with a bunch of long-haired, vulgar hippies and did not know why the directors had to pick him for the job. He also feels that the employees are paid to work and not to think. Mr. Nelson's initial reaction carried on in his subsequent relationship with his subordinates.

The staff felt that too much pressure was being placed on them by Mr. Nelson and they were not going to continue to work for a dictator or a slave driver.

II. Symptoms

The symptoms are as follows:

1. high turnover of personnel in the branch office;
2. low morale;
3. stress is very high;
4. minimum differentiation between head of branch office and director of the central office;
5. low integration between branch office and central office;
6. poor communication between subordinates and supervisor.

III. Causes

1. Lack of coordination between the central office and the branch office. As Miller (1967) points out, "failure to differentiate on the appropriate basis will create stress in relationships, because the natural groupings inherent in the structure of task performance will run counter to the groupings dictated by the formal organization."¹ The branch office is allowed to operate without control from the central office. The central office uses surprise visits to check performance as if to "catch" the branch director off guard, causing increased anxiety and stress.

2. There is an inflexible, rigid work procedure. The staff cannot modify or deviate from the applied schedule.
3. Leadership style causes poor communication, low morale, stress, and high turnover of personnel. However, as will be noted in item 4 below, leadership style is caused by conflict. Wilson (1968-69) points out that participative and bureaucratic management practices are strongly related with cooperative and opportunistic adaptations respectively. In the bureaucratic leadership style, high privilege units subordinates are likely to have opportunistic₂ adaptations but as time goes on a shift results towards alienation.

Evidence presented by Cioffi (1958) showed the relationship between leadership style and productivity, absenteeism, and turnover. Productivity is higher when the supervisor has a certain style of leadership. Men work harder when supervised in certain ways indicating that style of leadership is the cause of output difference. Labor turnover was not related to supervisor dimensions or to size of groups. Leadership style helps the subordinate in his role obligations and style of leadership is more significant in directing supervision than it has in hierachial influence. Democratic leadership enhances closer interaction between supervisor and subordinates leading to higher outputs and more cohesion in organizations.

Research by Oaklander and Fleishman (1963) may be related to leadership style. This study points out how patterns of leadership are related to stress. Consistent results in this study show consideration emphasized by the supervisor. Higher consideration is related to lower intra-unit stress. In no case was the amount of consideration related to inter-unit stress.⁴

With respect to leadership and perception of communication between superiors and subordinates, Webber (1980) indicated in his research findings that initiators perceive more verbal communication than receivers for upward and downward channels. Managers with active, high initiative would tend to perceive and be perceived differently than a manager with more passive, inactive lower initiative.⁵

4. The special branch is structured on place and function departmentation. Although the director of the special branch reports to the branch director, the division chief within the branch supervises the special branch (directors' representative). The position of divisions chief is equivalent to the special branch director so the positions are lateral. This creates conflict within the organization. The special branch director's job, which is equivalent to division chief, is a stepping stone to promotion whereas the central division chiefs' jobs are not. A conflict of individual goals versus organizational goals may thus cause an attitude change in leadership to one of authoritarian and strict control. The special branch director wants to achieve the organizational goals at the same time as achieving his goal of promotion.
5. The division chiefs of the branch office have excessive authority over the branch office which is causing stress for the special branch director. The special branch director is trying to maintain

power and authority that he does not have and he is doing it by use of force. His position is seen by the employees as just another cog in the machine. His position holds no power and no respect but his imposition of power upon the employees causes anxiety and low morale.

IV. Alternative Solutions

1. Transfer Mr. Nelson out of the branch office and replace him with Mr. Peron.
2. Change the selection system of the division so that a thorough screening and interviewing process takes place to ensure a higher probability of selecting better management staff.
3. Develop closer liaison between the branch office and the central office so a higher degree of differentiation will develop, in that both departments will not create cognitive dissonance. This would also increase the quality of collaboration between departments and will achieve a higher degree of unity of effort by the environment.
4. Dismiss Mr. Nelson because it does little good to send him back to another top-level job in the main office with his present attitude and where he can now impose his new authority upon the branch office to get even.
5. Attempt to change the attitude of Mr. Nelson by interpersonal training (T-group, group therapy, etc.).
6. Reorganize by incorporating the special branch into the branch office.

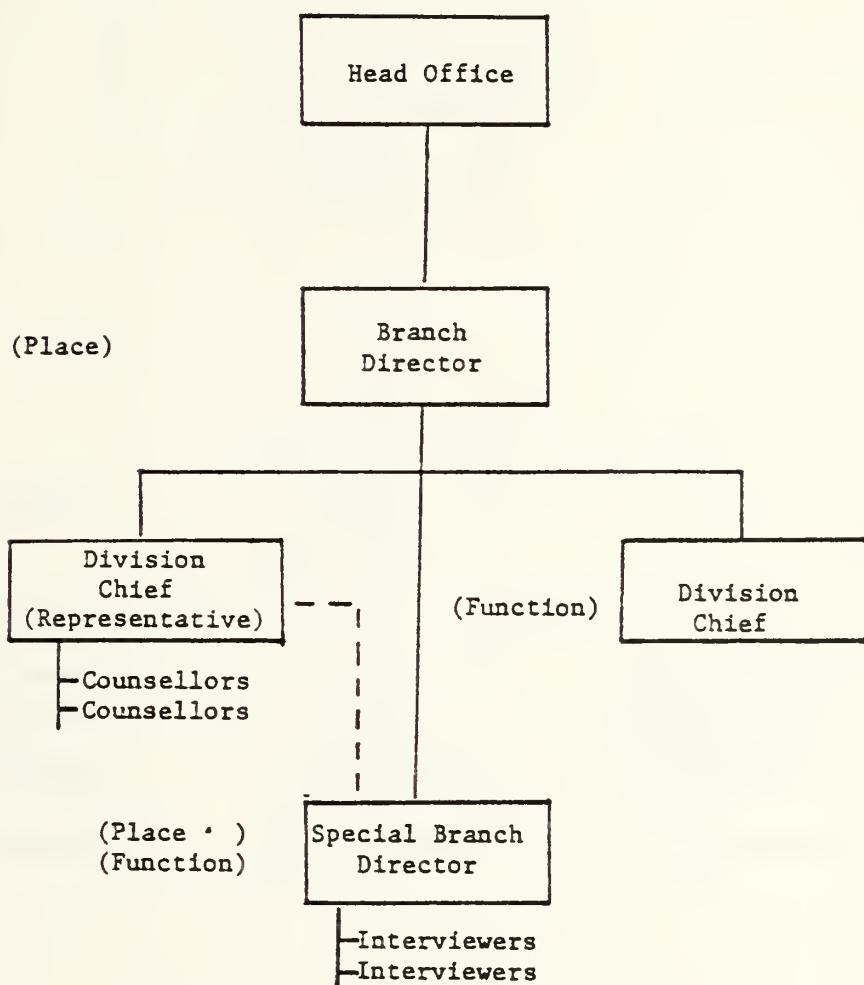
V. Optimum Solution

There is little opportunity to change the supervisor's attitude in his present job as special branch head because of the time factor and the present organization structure. There was only one month left in the operation of the special branch before it closed down for the winter. The best interim recourse in this type of situation is to remove him by transferring him to the branch office and bring in an interim manager like Mr. Peron. There is an obligation by management to alleviate stress and anxiety and try to make the office a cohesive unit again, and someone like Mr. Peron has the personality to do this. In preparing for the following year, a reorganization of the branch office should be instigated to incorporate the Student Manpower Office as indicated in the proposed chart in Addendum B. This would place all of the division chiefs on a horizontal level with the same power and authority reporting directly to the branch director. The method of promotion would then be on merit and any one of the division chief's jobs can qualify for the "stepping stone" for promotion. Inspection of the Student Manpower Office would be the responsibility of the branch director. A reorganization of this type would minimize the conflict of goals between the individual and the organization and would reduce

the stress on the division chiefs. Mr. Nelson's attitude of leadership cannot be changed easily by group dynamics, if it can be changed at all, so it does little good to place him in such a program. His attitude could be modified over time and perhaps if he is given an equivalent position where he can see his goals as congruent with those of the organization.

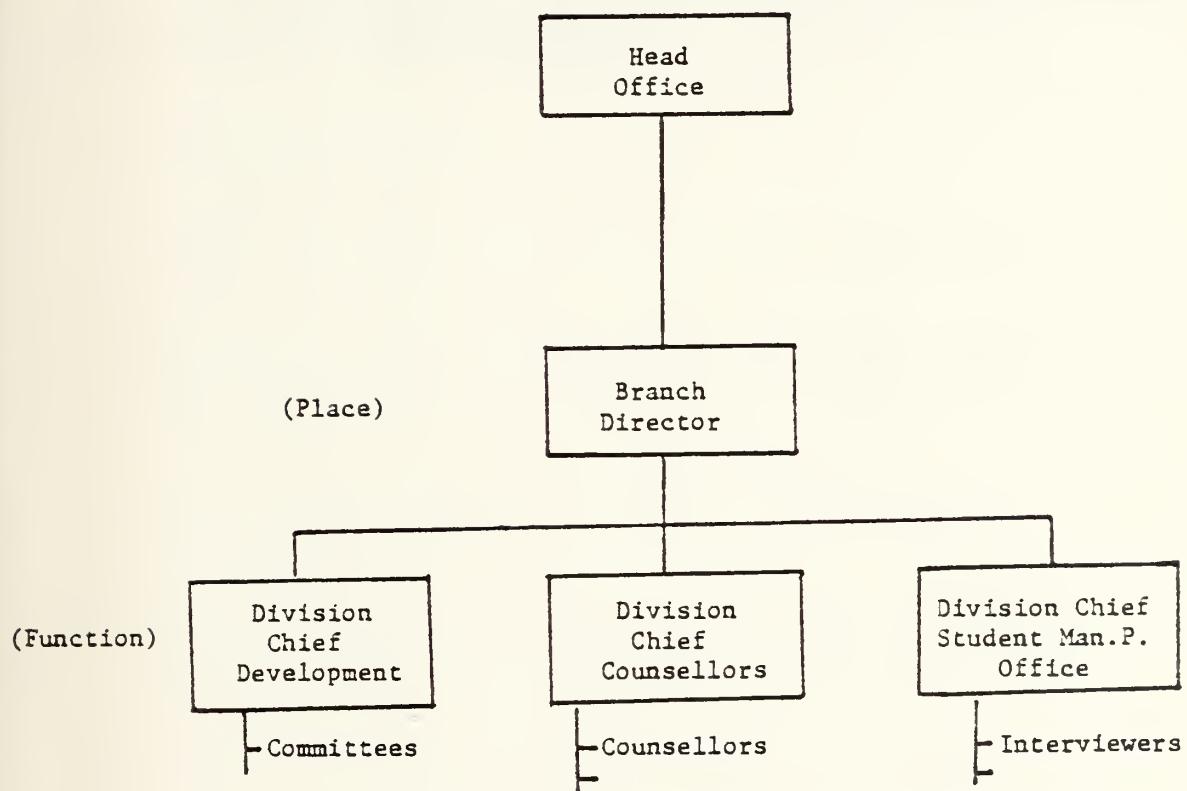
ADDENDUM A

PRESENT ORGANIZATION CHART
FEDERAL MANPOWER



ADDENDUM B

PROPOSED ORGANIZATION CHART
FEDERAL MANPOWER



Footnotes

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